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THE AUTOMOBILE AND MOTOR REVIEW

WEEKLY

NEW YORK — SATURDAY, DECEMBER 27, 1902 — CHICAGO

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The Salon de l'Automobile at the Grand Palais

[By Mail Advices of December 11 from Paris]

EVERYTHING was in readiness at the appointed hour for the opening of the Fifth Annual Automobile, Cycles and Sports Exhibition at the Grand Palais in Paris, on December 10. Early in the morning the sweepers, the strewers of sand, the decor-

ators and the whole legion of helpers who put the finishing touches upon the great display, had danced attendance to their superiors. Every exhibit was in its place, covers and tarpaulins had been removed and tucked away, and the last fleck of dust

had been blown off before the doors were thrown open.

This marvelous courtesy to the public was the first surprise to an American visitor, and, as all of Paris knows, was due to the genius of Gustave Rives,



[Photo by Granger-Noyé, Paris.]

INTERIOR VIEW FROM THE FIFTH ANNUAL AUTOMOBILE SHOW IN PARIS — TWO WEEKS, BEGINNING DECEMBER 10.

the director of the show, whose talent for organization and artistic arrangement is equaled only by the inflexibility of the orders which he issues with smiling countenance, and which all French exhibitors had learned to obey implicitly from experience at the shows of the two preceding years.

Only one unfortunate circumstance detracted from the perfection of the arrangements. The weather was cold and raw. The clouds hung low in the morning and threatened snowfall later in the day. Luckily, this threat did not materialize. But Paris expects a mild temperature in December, and the huge building was heated only with hard coal stoves of very moderate size and very limited number. Outside, on the Place de la Concorde the water nymphs at the fountain looked decidedly uncomfortable with icicles pending from their noses. In the Grand Palais the temperature proved stubbornly chilly.

Nevertheless, from half past nine in the morning great crowds could be seen hurrying toward the exhibition from all directions. At 9:57 the ministers of commerce and of agriculture, Messrs. Trouillot and Mougeot, arrived, and were received by Mr. Rives, the presidents of the two associations of manufacturers, Messrs. Darracq and Max Richard, and the entire board of governors of the show, including Baron de Zuylen de Nyevelt, president of the Automobile Club de France, and many of the best known constructors of French automobiles and leading men of the industry. A moment afterward Mr. Maréjouis, the minister of public works, put in his appearance. Police officers were numerous; even the prefect of the police, Mr. Lépine, was there surrounded by his staff, and when he had sampled the climate of the building he gave orders that a physician from one of the hospitals should be sent for to remain on hand all day to take care of sufferers from the cold.

RECEPTION OF PRESIDENT LOUBET.

At 10 o'clock, sharp, President Loubet alighted from his landau at the grand staircase, accompanied by General Dubois, his military attaché, Commandant Chabaud and Mr. Combarieux, his civil secretaries, and Mr. Henry Poulet, the *chef de cabinet*.

Mr. Rives, in behalf of the organization committee, made a brief speech of salutation to the President of the Republic: "Monsieur le Président de la République, we are happy to see the chief of the French Government," were his words, according to *L'Auto-Vélo*, "come here to inform himself of the importance and splendor of our great annual demonstration relating to an industry which has its center in France and creates a livelihood for thousands of workmen."

The advantages of brief addresses seem to be fully appreciated in France; yet these few words indicated plainly the immense prestige which has accrued to the automobile industry in France from the Government's friendly interest in its development.

The cortege of the President now entered the nave of the structure and the Dufayel orchestra, placed above the entrance from Avenue Nicolas, struck up the national anthem, which is still the *Marseillaise*, though the words of defiance to other nations are no longer to be taken literally.

A delegation including nearly all the well-known names of the French Club and the patrons of the automobile movement, received the cortege, while the general public already streamed in in great numbers and impeded the passage of the dignitaries of the occasion.

Advancing first toward the middle of the nave, where the view of the main body of the exposition is particularly magnificent, the President and his suite made a circuit of the stands, describing a double S through the aisles, which impressed one as streets in a magic city, so gorgeous and elaborate were the fronts of the stands and the decorative effects.

POLITENESS OF THE RULER.

Wherever President Loubet stopped for an explanation of the exhibits he had an amiable word and a smile and frequently a remark showing how well his memory retained facts relating to each of the exhibiting firms. Though not a motorist like the king of England and the king of the Belgians, he insists on informing himself upon everything that bears on the progress of the automobile movement, even the principles of mechanical improvements. But he is especially interested in exports and in the use of alcohol as a power source.

The French are justly proud of the intelligence displayed by their highest government officers in lending the dignity of a State function to the festivals which mark the victories of automobilism. The contrast between this attitude and the cold indifference shown by the State and Federal authorities in the United States, is striking, and what this means to an industry which necessarily must struggle against prejudices and the caution of capital before it can attain the vast national importance to which it is destined, is evidenced in the jubilation of the standard bearers in France over the recognition accorded it. "Decidedly this was more than a mere official *matinée*," wrote the *Auto-Vélo* the morning after the inauguration. "Where are now those days when the ministers of State had to be urged to attend the opening of the Salon? This time everybody felt the prodigious force, the magnificent *élan* emanating from the very nerve center of the nation which the Salon represents. The President of the Republic and three of his cabinet came here of their own accord to see with their own eyes. Hereafter the Automobile Salon is to be classed among the great vital demonstrations of the nation, and it is no doubt to the high initiative of the Automobile Club de France that this is due. The results of seven years of patient ef-

forts and of intelligent groupings of divergent volitions and relations of all sorts, appear now patent to all and beyond discussion. A social force has been created to which no one can remain indifferent in the future."

AN EXAMPLE FOR AMERICANS.

This note of keen appreciation of a purely moral support from the first in the land, was not the least interesting feature of the formal opening of the French show, suggestive as it may be in the United States of some vigorous step to secure official recognition of the truly immense importance attaching to rapid development of the automobile principle in all its branches.

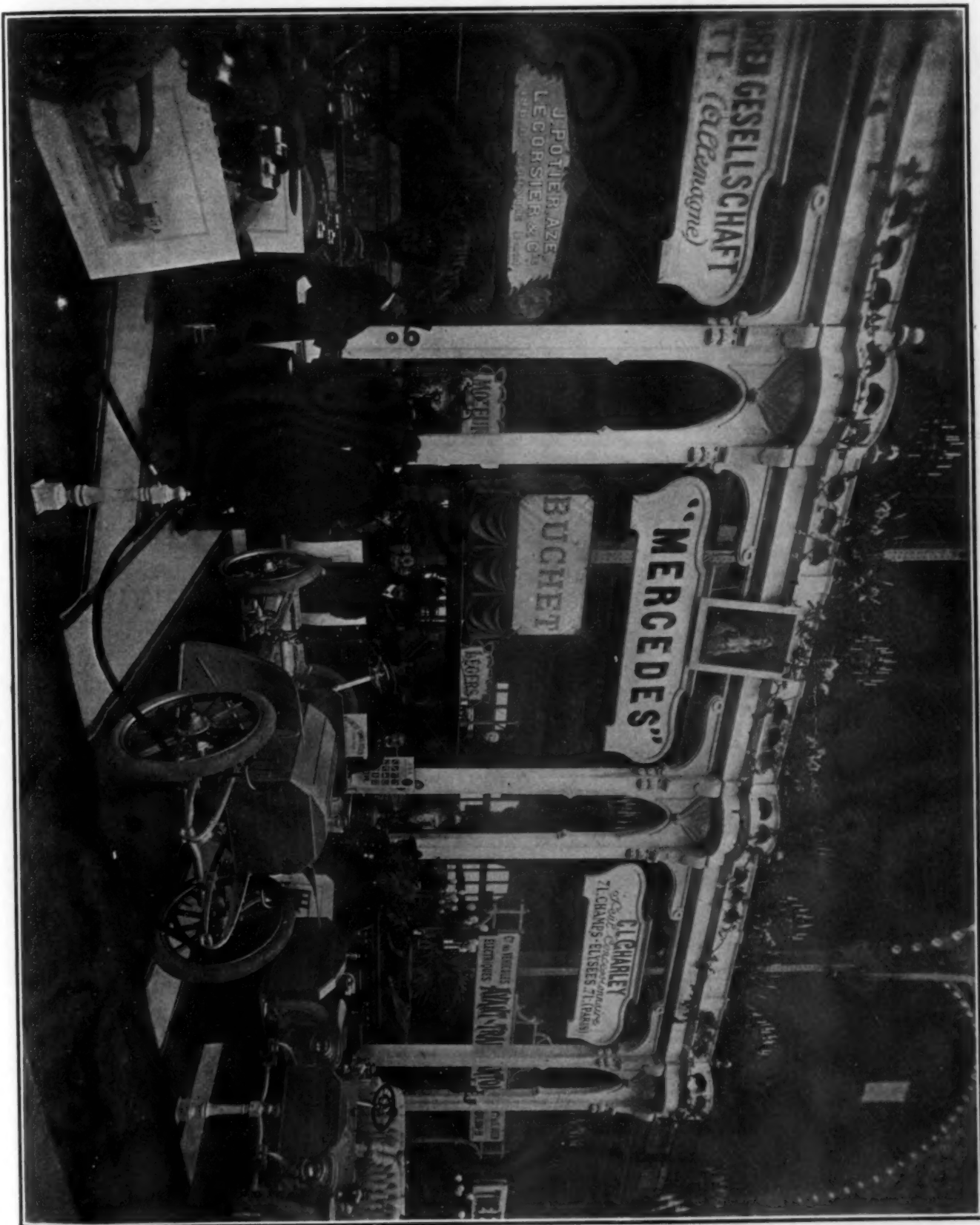
After finishing the round of the stands in the main hall the presidential party visited the show quarters of the Automobile Club—a room splendidly appointed in Japanese style. There, too, a brief welcome was offered the guests, Baron de Zuylen expressing the wish "that the display of wealth witnessed at the Show would convince the Government even more thoroughly than in the past of the need of defending a movement which had such results to point to." The president responded and the minister of commerce added a few words. The traditional glass of champagne was passed to the executive head of the nation, and then Max Richard, for the manufacturers' association, outlined the progress of the industry, pointing out that the French exports in 1900 amounted to 7 million francs, in 1901 to 15 millions and in 1902 from January to November rose to 32 millions. The progress was ascribed to races, shows and technical improvements.

Still another of the representative bodies connected with automobilism entertained the men of state. The Touring Club de France had an exhibit representing a room in a modern hotel, a little marvel of comfort and hygiene where everything is simple, clean and tasteful, and where nothing essential to the traveler's convenience is missing. The arrangements were explained to the last detail to the presidential party, who then passed into the Alcohol Section in which a great patriotic interest is centered.

THE PET SECTION OF THE SHOW.

This was the snug corner of the exposition, though located in the dome of the banquet hall of the Palais, known as one of the coldest spots in the building. On this occasion it was comfortably warm and brilliantly lighted, both the heat and the light being due to the apparatus in which the various uses of the intoxicating hydro-carbon were demonstrated. Mr. Mougeot, the minister of agriculture, here assumed the rôle of host, on the strength of the persistent work done under the auspices of his department for stimulating the use of alcohol in automobiles and thereby uniting the interests of agriculture and manufacture.

[Photo by Grauer Noyé, Paris.]
THE "MERCEDÉS" STAND AT THE GRAND PALAIS—FIRST EXHIBITION ON FRENCH SOIL BY DAIMLER MOTOREN GESELLSCHAFT.



A CHECK ON COMMERCIAL GREED.

It is impossible to convey an impression of all that was accomplished for the French automobile industry in the two hours while President Loubet passed from stand to stand. In the recital of it there is only to record a handshake here, a *bon mot* there; a somewhat lengthy conversation in one place, a brief inquiry in another. It may be well to add that every movement of the President was zealously watched and chronicled. No doubt those who received marked attention will strive to conduct their business so as to receive it again next year. If confronted with the choice

observed in this crowd, but the English and German contingents were prominent. Eighty members of the British Automobile Club formed a caravan which kept well together. They had engaged quarters at the Elysée Palace, and wherever they appeared at the Exhibition their phalanx commanded attention.

To give American readers even the most cursory account of the details of this, by far the greatest automobile show which has ever been held anywhere, would manifestly be impossible after a single day of observation. Apart from the difficulties in examining the exhibits on the opening

for discovering what was worth examining and describing, was quite impracticable. It required the combined efforts of all representatives of the press to bring to notice what each stand contained, before a search for the most important exhibits could be instituted. THE AUTOMOBILE gave an account of the departments included in the exhibition in its issue of November 15. It may here be repeated:

CLASSIFICATION OF EXHIBITS.

The show embraces sixteen classes of exhibits most of which are kept strictly separate, so as to permit visitors readily to give special attention to those branches in which they are most directly interested. These classes are as follows:



[Photo by Granger-Noyé, Paris.]

THE LOCOMOBILE COMPANY OF AMERICA AT THE AUTOMOBILE EXHIBITION IN PARIS.

between immediate pecuniary profits and energetic efforts for constant improvement of their product, they may be more inclined to adopt the more ideal policy, feeling that the eyes of the nation are watching them, than if all were left to purely commercial competition.

In the afternoon the crowds of visitors increased to such an extent that it took half an hour to cross from one side of the Show to the other. The stream of people was so dense that few could have been able to see anything of the exhibits. Remarkably few American physiognomies were

day when the aisles were packed and the attention of all was directed upon the general effects, the size and scope of the Show furnished more material than any one person could "shake a stick at" in a month. As compared with last year's exhibition in Madison Square Garden or the Coliseum, it is no exaggeration to say that the Paris event in actual dimensions and numbers is at least five times larger, all its departments considered; while in the impression created on the mind, comparison is really out of the question. To depend solely upon one's own resources and a program

(1.) Complete automobiles of all descriptions, including motorcycles, exhibited by manufacturers only. An exception is allowed in the case of exclusive representatives of some foreign (non-French) machine who are admitted in this class if they agree to exhibit only the one manufacture which they represent.

(2.) Cycles of all kinds.

(3.) Construction material and tools used in manufacture of automobiles, bicycles, etc.

(4.) Tires for motor vehicles and cycles.

(5.) Châssis (running gears and frames).

(6.) Component parts and accessories.

(7.) Motors for automobiles and boats; storage batteries.

(8.) Automobile trade; this class is reserved for dealers exhibiting vehicles handled by them.

- (9.) Navigation.
- (10.) Aeronautics.
- (11.) Applications of denaturized alcohol.
- (12.) Divers sports and touring.
- (13.) Carriage body work for automobiles.
- (14.) Dress and equipments for automobilists, cyclists and tourists.
- (15.) Invitations and sundry matters pertaining to automobiles, cycles and sports.
- (16.) Bibliography, photography, maps, periodicals.

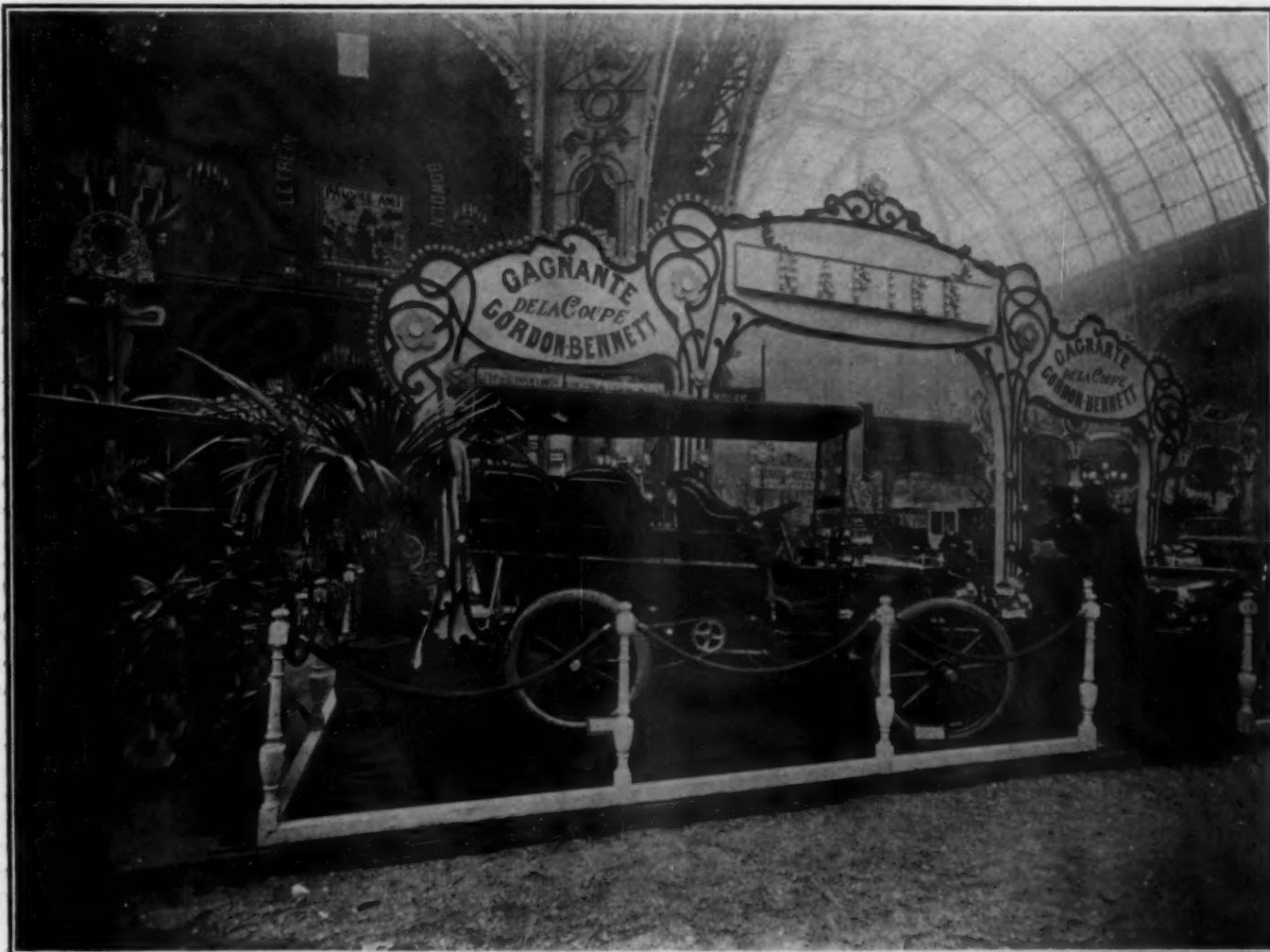
MUCH MERIT YET UNSEEN.

In this great array of interesting matter the complete automobiles presented by the leading manufacturers of France, England, and Germany, naturally hold the first place, and in regard to these some of the

correspondence to this publication, it was known far in advance of the opening of this Show, that the leading characteristic in the pleasure cars of large size and power would be the very general adoption of certain features in construction and design which had been introduced and tried out during the past year in Mercedes-Daimler vehicles, and which were originated by Mr. Maybach, the engineer of the Cannstatt-Daimler company. The Show confirms this advance information and also brings out the exceptions to its rule. Messrs. Charron, Girardot et Voigt pride themselves on not being in the

"honeycomb" radiator with lengthened, square-front motor hood, which is the external mark of "Daimlerfication," have been strongly influenced by the superb attention to mechanical perfection in details in which Mr. Maybach was the leader.

Mors and Panhard have frankly adopted the Mercedes design, including the "honeycomb" radiator with fan, wrought or pressed steel frame reaches, mechanically operated admission valves and noiseless exhaust, and yet they have managed to preserve the individuality of their product, in a very large measure, by a number of



[Photo by Granger-Noyé, Paris.]

THE BRITISH NAPIER CAR—WHICH WON THE GORDON-BENNETT CUP THIS YEAR—AT THE PARIS EXHIBITION.

leading principles in new construction and new styles may be presented at once, thanks to the liberal disclosures which were allowed to reach public notice before the opening of the Show. But signs are not wanting that new construction of great merit will also be found among the manufacturers whose fame has not yet extended far beyond the boundaries of France, and for the more searching inquiry into these and other things readers are referred to subsequent issues of this publication.

As previously reported in the foreign

"Mercedes class" and their stand is not only among the most popular and attractive, but contains novelties in construction to which extended reference will be made. Darracq, also, holds aloof from imitation. Clement yields only in his 12 and 16 horse power models. Diétrich models have their own distinctive individuality, including a cooling apparatus in which a powerful turbine sends the water rapidly to the front coils. Renault Brothers are also keeping on in the even tenor of their ways. Still it must be said that even these firms that have not adopted the

original and important refinements, of which space and time forbid extensive mention this week.

PASSING REFERENCE.

Passing reference should be made to the new Krebs carbureter, however, with which Panhard vehicles will be fitted. This invention was completed only a few weeks ago and is not installed in the vehicles on exhibition, but it is looked upon as a very remarkable product of the Panhard engineer. It regulates the gas feed automatically according to each stroke of the motor, and this improvement is accom-

plished by means of a small piston actuated by the pressure of the motor and in turn regulating the current of air in such a manner that the mixture is always of the proper proportions. Another new departure of the Panhard firm is the adoption of a three-cylinder motor, of our Duryea pattern, for an 8 horse power car, and also the production of a gasoline touring car with electric power transmission and electric motors in the front wheels. It is said that it is built under the patents of Lohner-Porsche, the Vienna manufacturers.

A stand which appealed strongly to President Loubet was the Krieger. This firm has been known as manufacturers of electric vehicles for a long time. This year it is significant that Mr. Krieger has adopted the gasoline motor instead of the storage battery to supply current for the electric motors, producing a car very similar to the Panhard vehicle, to which reference was just made.

POSSIBILITY OF ONE COMMON TYPE.

It seems worth noting that manufacturers of gasoline cars and manufacturers of electric vehicles thus meet on common ground, by eliminating their weakest features: the transmission and variable speed gear in the gasoline car and the battery in the electro-mobile. When remembering that British experimenters have obtained increased efficiency from gasoline motors by injecting water into the cylinder with the explosive mixture (which is, of course, converted into steam), and that the advantages of alcohol seem to depend somewhat on the water which forms 10 per cent. of its composition, and when finally recalling to mind that several patents have been issued for steam generators in which successive explosions of a gas mixture produce the required heat, besides supplying an expansive force of a different nature—the possibility arises to the reflecting mind that perhaps in some distant future the three existing types of gasoline, steam and electric vehicles may be merged into one which will be generally accepted as the best for all purposes.

The Krieger mixed car is operated without auxiliary batteries, and is sure to attract American visitors by its quiet elegance and noiseless running. After all it may be, though, that Mr. Girardot of the C. G. & V. firm has found the simpler solution of the variable speed question—in which simplicity of operation is also involved. An 8-cylinder motor of 40 horse power, designed by him, is fitted to a running gear devoid of the usual variable speed-gear box. In fact, the machine is operated entirely through the motor, which has been rendered highly flexible as a power source through improved carburation and the use of a motor brake acting on the exhaust, the latter practically an extension of the principle used in many cars for governing motor speed.

The driver controls this machine—as to speed—by a single lever, which functions as the throttle lever on a steam vehicle.

VARIETY OF CARRIAGE STYLES.

The great variety of models which distinguishes this show from all its predecessors is well exemplified at the C. G. & V. stand. They exhibit, besides three frames, or *châssis*, of 15, 20 and 40 horse power machines, one 15 horse power limousine, one 20 horse power limousine, one 20 horse power coupé, one 15 horse power tonneau of the "King of the Belgians" pattern, one 20 horse power cab, one 15 horse power tonneau of regular model, one 15 horse power double phaeton, a machine for the Ministry of War, armored and equipped with a Hotchkiss rapid firing gun. The carriage work for these machines is produced by four different carriage makers; and this last mentioned fact immediately brings to the mind of a New Yorker the peculiar backwardness of American carriage makers in taking hold of automobile problems, a super-conservatism which may be explained perhaps by our forms of carriage manufacture, but which nevertheless is highly detrimental to the carriage makers themselves, as well as to the automobile industry. From the observations made at this show and in the streets of Paris, there can be no doubt that the co-operation of old, experienced carriage builders contributes valuable aid to the artistic and picturesque side of automobile construction, and multiplies the number of styles in use, in a manner which pleases the eye and undoubtedly also brings many converts to the pastime.

It would be impossible to close this fragmentary account of first, and perhaps fugitive impressions without reference to the magnificent booths where automobile clothing and furs are exhibited. They would reveal undreamed of chances for profitable business to our unimaginative designers of similar articles, but this feature also will be illustrated or described in a subsequent issue.

SELF-RELIANCE PRODUCES IMPROVEMENTS.

Summarizing the first impressions as briefly as possible, the Paris show is technically and artistically far beyond anything that can be produced in the United States at the present moment, mostly, it seems, because French manufacturers have gained absolute self-reliance through the reliance placed in them by their own Government and by motorists of other nations. But after all they lack much which we possess. Their industry, with few exceptions, caters to the rich only. They have nothing exactly corresponding to the best of our runabouts in any of the three classes of power. The perfection of their large cars still runs largely to high speed, while they are noisy and inconvenient at a slow pace, and at the start, compared to our best models.

As the French have imitated the Mer-

cedes construction, and perhaps improved it, all within three months, so may we undoubtedly absorb all that the French industry knows—if we earnestly wish to do so—in a few months.

But withal, the show is a demonstration of vitality and promise which has never been equaled by any other young industry, not even by the electric industry which has given so many brilliant manifestations of its vigor at special exhibitions. The automobile industry enters more deeply into the life of humanity, and from this fact it draws a strength which is not yet fully realized with us, but which the French have comprehended with their singular gift of imaginative intuition.

Minor Foreign Notes.

W. K. Vanderbilt, Jr., has made entry for the Paris-Madrid race, preparations for which are going on with great activity. David Wolfe Bishop is also expected to enter his new car.

The Automobile Club of Germany proposes to form a press bureau to follow up all automobile accidents reported in the daily papers, ascertain the true causes and publish the better version.

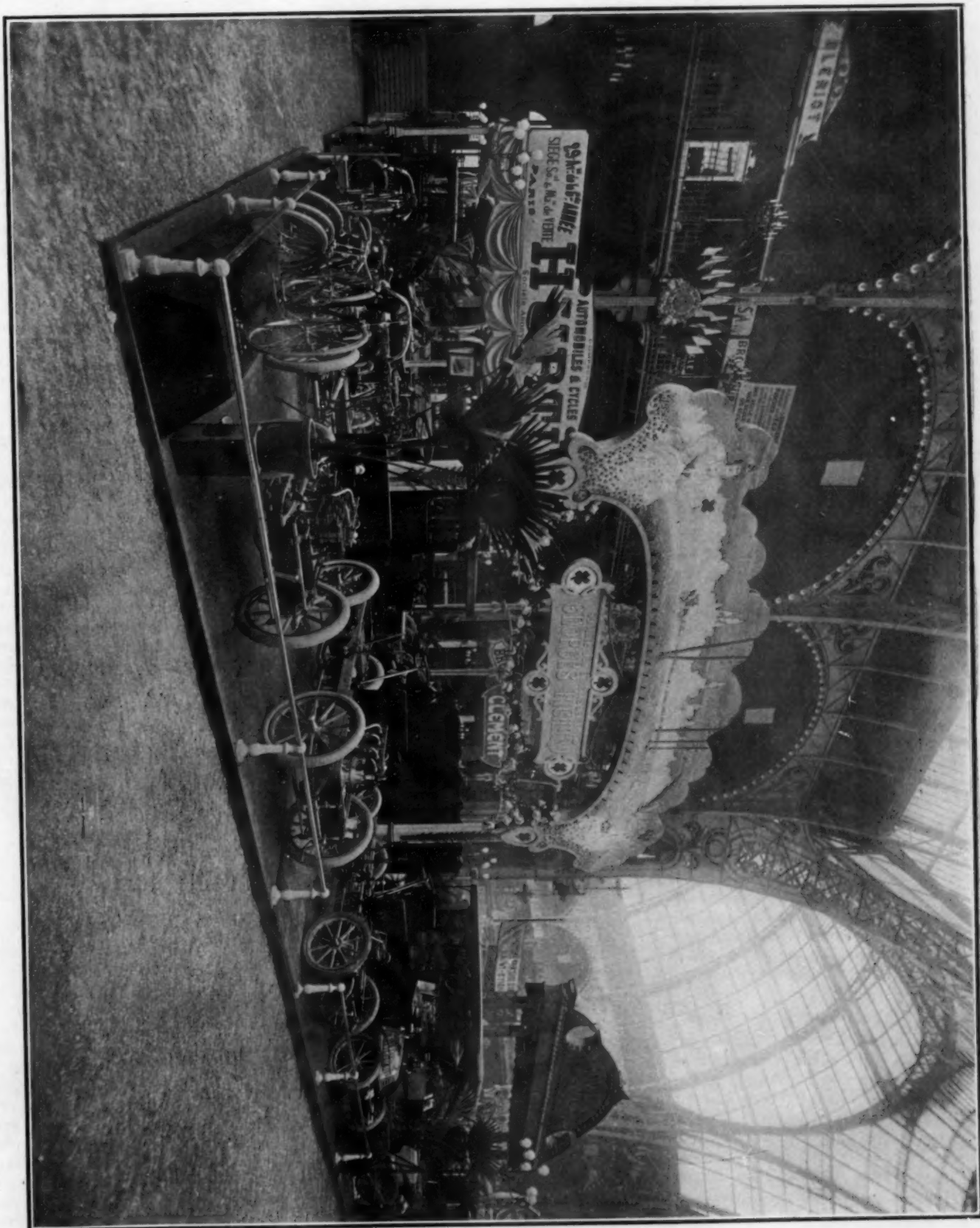
A traveler from France, Mr. Neubauer, who has just returned home after a tour of the United States, reports in *La France Automobile*, that of all the products of the American industry only the Winton cars can lay claim to an honorable place in the world markets.

La Stampa Sportiva gives an interesting illustrated account of dog races, which are said to have grown popular lately in England, Belgium, Holland, Italy and Germany. Fox terriers and bull dogs are the breeds most easily trained for this sport.

All carriages are prohibited in the cemeteries of Paris, exception being made only in cases of old and feeble persons, who are accorded a special permit for the use of a vehicle by the Prefect of the Seine. This permit, however, is not honored by the custodians in the case of an automobile.

We hear from England that the Locomobile Company of America is building a steam brougham, intended especially for winter use in town. The design was made by the company's British representative, Mr. Letts. The brougham body is to be removable so as to transform the vehicle into one of the company's ordinary surreys for summer use.

Brouhot & Co., of Vierzon, France, whose work has heretofore been mostly in gasoline and alcohol motors, will enter automobiles in all races during 1903. The Brouhot motors earned highest award for efficiency with alcohol fuel in the trials conducted under government supervision in connection with the *Circuit du Nord* races.



[Photo by Granger Noyé, Paris.]
GEORGES RICHARD AUTOMOBILE CHASSIS, FINISHED VEHICLES AND BICYCLES AT GRAND PALAIS - A MODEST STAND AT THE PARIS SHOW.

Auto Information for the Novice—IV.

BY W. P. STEPHENS.

THE GASOLINE OR HYDRO-CARBON CAR.

The "internal combustion" or "explosion" motor can claim none of the antiquity of steam, but is in effect a development almost as recent as the motor car itself, the fame of the late Gottlieb Daimler resting equally on his achievements in the perfection of the explosion motor and the development from the first experimental motor cycles of the magnificent cars which bear his name. Without attempting to describe the theory of the modern gas engine or to discuss the merits of the four-cycle and the two-cycle types, the general principle of operation may be briefly outlined as follows: The engine consists of a cylinder and piston identical with that of the steam engine, except that it is "single-acting," the cylinder being open on the end nearest the crank-shaft. There is no boiler, but the fuel—gasoline or a similar volatile oil—is used direct from its cold liquid form. A small portion, only a drop or two, is forced through a pipe; meeting a current of air, the drop is broken up into spray and mixed with the air, giving a highly explosive vapor. This vapor is admitted to the closed end of the cylinder and there exploded, either by direct heat or by means of an electric spark, the expansion forcing the piston to the other or open end of the cylinder. Unlike the steam engine, there is no corresponding explosion at this end to drive the piston back, but a flywheel of considerable weight is necessary to maintain the continuity of motion with this intermittent application of the force. At first glance the machine would seem to be crude and ineffective in the extreme beside the perfect sequence of the steam engine; but such is not the case in practice, and the absence of boiler, burner or furnace, and a large quantity of fire is a material advantage. The perfection of the "gas engine," "explosion motor" or "internal-combustion motor," as it is variously called, between the years 1885 and 1895, has brought about a complete revolution in small yachts, formerly driven by the steam engine and boiler.

PRINCIPLES OF THE EXPLOSION MOTOR.

We will consider first the various elements of the gas engine plant and how they are best adaptable to the motor car. Unlike the steam engine, the cylinder of which in operation is heated only to a moderate degree which does not interfere with its perfect working, the gas engine, with its explosions of perhaps 500 to 1,000 per minute, gives forth an increasing quantity of heat, and unless some special method of cooling be provided the cylinder would soon become so hot that the charge of vapor would be automatically exploded before the piston had passed the

center and was in position for the inward stroke. In the marine motor this cooling is readily effected by casting the cylinder and often the cylinder-head as well with double walls, the space between forming what is called a "jacket." Water taken by a pipe from the outside of the hull is admitted to this "jacket," absorbing the heat, and on passing from it is led by another length of piping out again through the side of the vessel. The same plan is followed in stationary gas engines, a special water reservoir being provided in the form of a tank or cistern, the volume of water being sufficient to cool the portion returned from the jacket. In the smaller motors used on bicycles and other very light vehicles the cooling is done by the air, the "water-jacket" being replaced by a series of flanges or ribs, termed "fins," which are cast around the cylinder and the head. These expose a large area of surface to the air, and as the motion of the vehicle insures a strong current of air, the temperature of the cylinder is reduced. The limitations of this system are as yet unknown. There are several makes of runabouts and small touring cars in which excellent results have been obtained by "air-cooled" motors; the great majority of four-wheeled cars, however, depend upon the "water-cooled" motor.

SPEED OR REVERSE GEARS.

We have now an engine which, with its increased cylinder dimensions, heavy flywheel and double walls, is much heavier than a steam engine of the same power, but we have dispensed entirely with the boiler, burner and large water tank; and, incidentally, we can afford to cut the fuel tank to about half the capacity necessary in a steam carriage.

In place of the small, light steam engine, capable of running in either direction and equally well at any speed from the slowest to the fastest, we have now a much heavier engine which will run in one direction only, and which will run economically and effectively at only one speed, that for which it has been designed. For this reason—and, further, as the engine cannot be stopped and started with the same facility as the steam engine—its application to the propulsion of a vehicle, is only possible by the addition of a system of gearing between the engine and the rear wheels, this gearing giving a change of direction—forward and backward—and also several changes of speed. As a matter of fact, great advances have recently been made in the line of remedying this elemental defect of the gasoline motor and of imparting to it that "flexibility" of power which is the main characteristic of the steam engine, but at the same time the

change-speed gear remains as an essential.

While boiler, burner and open fire are no longer required, there must be some means of igniting the explosive vapor in the cylinder; this was done in the early gas engines by a small tube of platinum inserted in the head of the cylinder, the exterior of the tube being kept at a red heat by a gas flame. The interior of the tube being in communication with the interior of the cylinder was filled with vapor during the compression stroke, and when the compression had reached a certain point the heat exploded the charge. This method of "tube ignition" is now in use only in the larger commercial vehicles and as an alternative in some of the foreign cars. It has been superseded by "electric ignition," an electric spark generated within the cylinder at the end of the compression stroke serving to explode the mixture. While the small dynamo or magneto of special design, driven from the motor, is now in very general and increasing use on all classes of gasoline vehicles, a storage battery is always carried, being used alone where there is no dynamo, or as an indispensable auxiliary to the latter.

CYLINDER COOLING DEVICES.

Mention has already been made of the necessity for cooling the cylinder by means of water circulating through its walls; this water absorbs a great deal of heat, and any such quantity as could be carried on a car would soon be boiling unless some special means for cooling it in turn were provided. This is done by a long length of tubing of small diameter arranged in spirals, the tubes being fitted with a large number of small disks or squares of metal which give an extensive area of radiating surface. As these coils are placed at the front of the car, where they are exposed to the strongest air current, they give a very effective method of cooling, especially at the higher speeds.

The exhaust from the motor, in the form of unconsumed gases, still remains to be disposed of in some way, in its natural state being both noisy and offensive to the sensitive nose. On passing from the cylinder it is carried to a closed receptacle, usually of cylindrical form, where it is allowed to expand, and is also broken up by means of plates or tubes through which it passes before making its final exit, in a comparatively unobjectionable condition, below the rear of the carriage.

We have now as the essentials of a "gasoline" plant an engine of one or more cylinders with a "vaporizer," a small fuel tank, a small water tank and radiating coils with a pump to force the circulation of the cooling water, a system of gearing interposed between the engine and the rear wheels, with levers controlling the gears, a battery and possibly a dynamo as well, and the "muffler." The complete lubrication of all parts is not only as indispensable as in the steam engine, but must be

carried out on a more extensive and elaborate scale, the cylinder of the internal-combustion motor in particular demanding constant and careful lubrication.

The term "gasoline vehicle," which is



MOTOR BACK CAR WITH HOOD FRONT.

in common use in this country to-day, though literally correct for the time being, is most inadequate, as it really applied not to vehicles propelled by gasoline, but to the entire type of cars with internal-combustion motors, which in England, France and Germany may use kerosene (paraffin), gasoline (petrol), benzine, alcohol, or other agents. At the present time gasoline alone is used in this country, but no one can doubt that sooner or later the same motor will be driven by other fuels, so that the term "gasoline vehicle" will be as incorrect as it is to-day inadequate.

TYPES OF GASOLINE MOTORS.

As compared with the comparative uniformity of type which characterizes both the steam carriage and the steam engine, the "gasoline car" and the motor are found in endless variety of sizes and styles. The vehicle finds its lowest limit in the common bicycle with a gasoline motor of about one horse power, next come the

hope and the four-seated surrey, and then the touring cars of moderate size carrying four persons, above them being the heavy and powerful cars of foreign make, accommodating four, with their luggage, or four in the tonneau, in addition to the two on the cross seat.

The design of the motor covers as wide a range as that of the car itself; the single-cylinder motor, which was at first in the majority, is giving place to two, three and four cylinders; in position the cylinders may be horizontal or vertical, and the former may lie across the car or fore-and-aft; in location the motor may be in the front or the rear, central or on one side. So far from any uniformity of practice, there has thus far been the greatest possible diversity, though the indications are that one type will finally predominate in all save the smaller cars.

While by no means an ideal construc-



MOTOR BACK COVERED CARRIAGE.

tion, the ordinary carriage body can be made to enclose the component parts of a gasoline plant as well as a steam plant, and all the early cars followed this form. The trend of modern improvement, how-

a familiar sight on every road, has already become a formidable rival of the ordinary "horse and buggy," and promises to become even more numerous as further improvements are made. Its

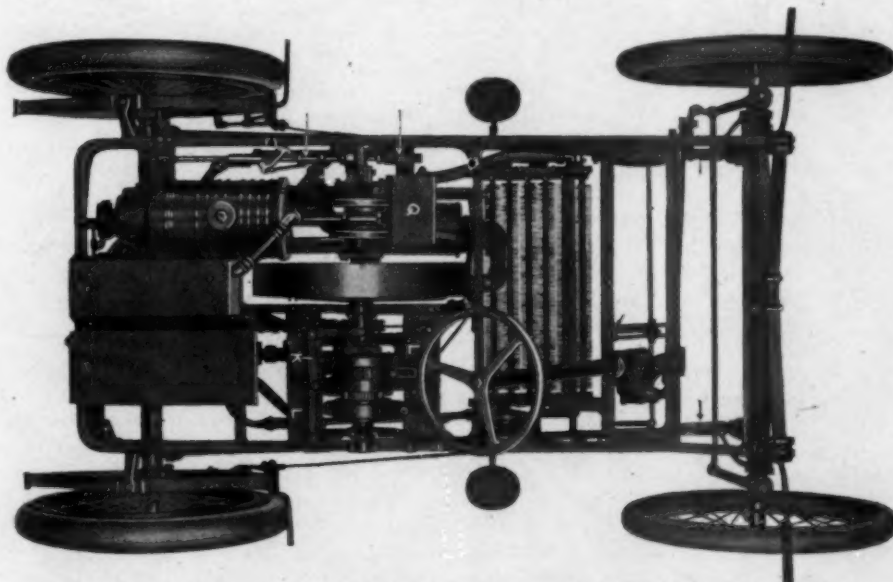


RUNABOUT WITH FOLDING FRONT SEAT.

price, from \$650 to \$800, places it within the reach of many who cannot afford a large car, and it appeals to others who at the outset are in doubt as to what style of car will best suit them and who can profitably experiment with the smallest before aspiring to handle the wheel of a big car. This class is well represented by the Oldsmobile, already described in full in THE AUTOMOBILE AND MOTOR REVIEW of June 28. The Olds engine is horizontal, with one cylinder of 4 1-2 inches diameter and 6 inches stroke, placed at the rear and slightly to the left of the center line.

The running gear is of the simplest description, merely two axles connected by two long springs, serving as "reaches." A light frame of angle steel lies on top of the side springs and connects them, also supporting the machinery. The engine is placed with the crank-case forward, thus bringing the main shaft nearly in the center of the vehicles. All the mechanism is driven directly from this main shaft, which lies across the car and parallel with the axles; thus making possible a connection between the sprocket on the shaft and the sprocket on the differential of the rear axle by means of a short chain. On each side of the driving sprocket, which turns freely on the shaft, is mounted a drum fitted with gear wheels, either of the two being so locked as to take motion from the main shaft and transmit it to the driving sprocket. One drum gives a slow speed forward and the other gives a reverse or backward motion. By means of a friction clutch the shaft may be so locked as to drive the sprocket ahead on the fast speed. A brake drum, the band on which is tightened by a foot pedal, is mounted on the hub of the driving sprocket.

The inlet and exhaust valves, by which the mixture of air and vapor is admitted to the cylinder and the gases are carried off after explosion, are located at the rear end of the cylinder, being operated by a rod which is driven by a worm wheel on the shaft just to the left of the engine, this same shaft serving to operate the sparking mechanism by which the charge is ignited. The gasoline is carried in an oblong tank to the right of the engine.



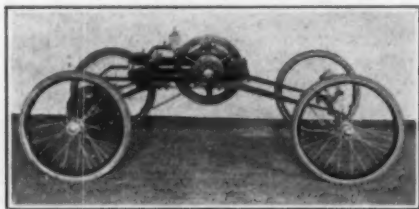
RUNNING GEAR AND MACHINERY OF AMERICAN MEDIUM WEIGHT CAR.

skeleton machines with three and four wheels, of which but few are found, then the "motorette" or small, light car for park and boulevard use, the runabout for two persons, the more substantial stan-

ever, has been toward the development of a different type as complying more perfectly with the theoretical requirements of a gasoline car.

The small, light gasoline runabout, now

The water tank is immediately over the engine, a hose leading to a small rotary pump on the left end of the main shaft, with a flexible connection between pump and shaft. The cooling tubes are in this case plain pipes, without the disks or "fins," a double row of them being arranged beneath the front of the body. The hot water from the cylinder jacket is



REACHLESS RUNNING GEAR AND MOTOR.

taken by a hose to the lower tubes, and after passing upward to the upper tubes, being cooled in the process, it is pumped back to the tank. The engine is started by means of a crank handle outside the body, with chain and sprocket connection between the inner end of the crank and the main shaft.

The engine itself, as well as accompanying speed gear, is simple and effective, and all are so arranged in close connection as to avoid straining of parts, while the driving chain and springs together give a very flexible connection between machinery and rear axle. The compact arrangement of all parts makes it easily possible to fit a small body with seat for two to cover them.

In some cars of this general type the ordinary elliptic springs are used, the motors are vertical and other changes of detail are made, but all are marked by simple mechanism arranged in a very compact form.

THE AMERICAN ROAD CAR.

The American cars of greater size and power, carrying two to four persons, have been developed largely along the lines of the small type just described, so far as the general construction and arrangement of parts are concerned, a different style of running gear being, of course, necessary. This class of car includes a number of well-known and successful makes, such as the Winton, Packard, Haynes-Apperson, Long Distance, Stearns, St. Louis, Gasmobile, Duryea, and the new Stevens-Duryea.

The increased weight, speed and power call for a stronger construction of the running gear than in the first class, and this usually takes the form of a rectangular frame of tubes or angles supported by four elliptic or semi-elliptic springs, with "reaches" between the axles or with adjustable inclined braces from the frame to the axle as substitutes.

The motor is horizontal and placed fore-and aft, sometimes a single cylinder, but frequently two cylinders, end to end, or "opposed." The main shaft is practically

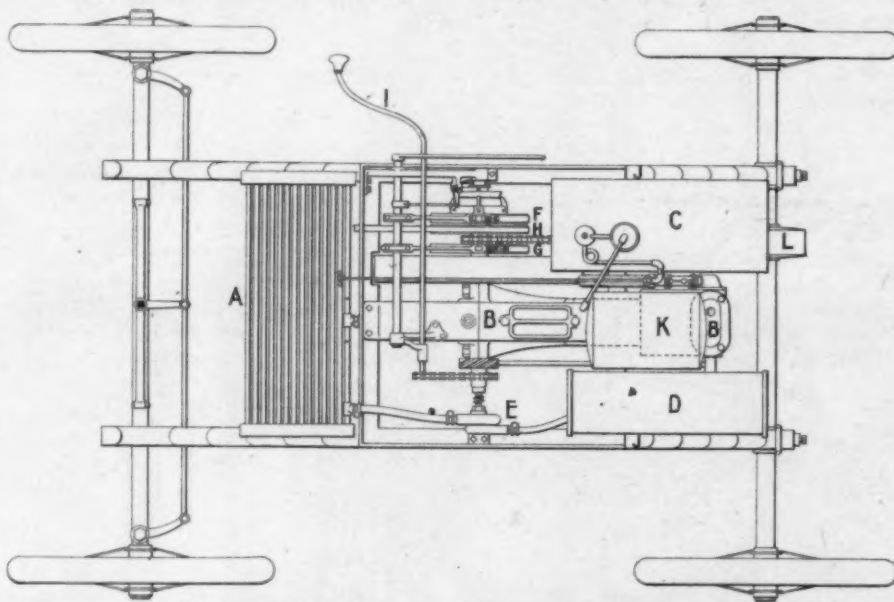
continuous across the width of the frame, and carries the change-gears and the driving sprocket with a single chain to the differential on the rear axle, sometimes in the center and sometimes on one side close to a bearing.

Various expedients are used to give a certain amount of flexibility to the shaft, as a solid shaft three feet long would necessarily bind when the frame was subjected to the strain of a rough road. The radiating coils are, of course, placed in front, where they are exposed to an unbroken current of fresh air. The gasoline and water tanks are located according to convenience, depending on the size of the car, the number of seats, etc. The change-gears are either of the "planetary" type, similar in principle to the differential, or a system with two parallel shafts with several pairs of gear wheels on them, those on one shaft running loose, except the one needed for the time being, which is temporarily locked fast. The changes are two or three speeds forward and one backward. In this system all the gear wheels are constantly engaged, all but the one pair in use running idle and with some loss by friction.

This type of car has back of it a good road record, having been in constant use from the introduction of the motor vehicle in this country down to the present

abandoned all semblance of carriage form and worked out a special type of road vehicle designed to meet the peculiar conditions of a locomotive running without tracks and carrying a load of passengers. In this type, now almost as well known in this country as abroad, the motor is placed in the front of the car, in a conspicuous position, which is emphasized rather than concealed by the "bonnet" or "hood," a covering of polished brass and enamel. Immediately back of the motor and hood is a vertical dash of wood, and in the rear of this the frame is in effect merely a flat platform to which various styles of body may be fitted, changes being made at will.

The motor, which is now quite as likely to have three or even four cylinders as one or two, is placed vertically with its shaft low down and running fore and aft, the flywheel being on the rear end. This flywheel is hollowed out on its rear side in conical form, to fit a disk, with its edge turned to a similar cone and faced with leather. This disk is mounted on a short section of shaft in line with the main shaft. A strong spiral spring on this shaft throws the two conical surfaces into contact, the motor thus giving motion to the second shaft. This in turn runs into the change-gear system, a cast metal box, sometimes of aluminum, with bearings in



PLAN OF OLDSMOBILE - LIGHT GASOLINE RUNABOUT.

A Radiator.
B Motor.
C Gasoline tank.
D Muffler.

E Water pump.
F-G Brake clutches.
H Chain.
I Starting crank.

J-J Side springs.
K Water tank.
L Differential.

time. With some theoretical disadvantages, the general plan gives practical efficiency and good service. The resulting vehicle is of necessity very much of a shaftless carriage, a fact which at one time was a recommendation rather than otherwise.

THE "MOTOR-FRONT" CAR.

Foreign designers of gasoline cars, notably the French, have of recent years

each end for the shaft and also for a third short section of shaft.

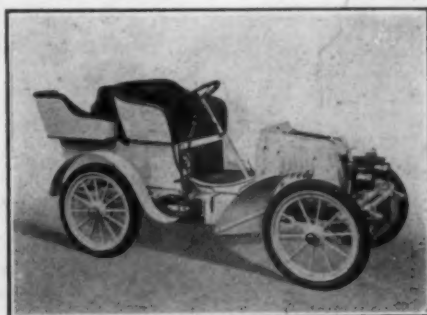
CHANGE GEARS AND TRANSMISSION.

The two sections of shaft within the box are fitted with three or four pairs of gear wheels, one of each pair being keyed fast to one of the shafts, while the other is so mounted on its shaft as to slide without turning. By means of suitable handles and levers any one of the sliding gears

may be thrown into contact with its mate, the others resting idle on their respective shafts and turning without friction. A look into the gear-case of a car which has been run for a short time will show the brutal and unmechanical nature of this system, the teeth of the gears being cut and jammed by the force with which they are thrown into mesh while running at speed; but in spite of this the system has in practice much to recommend it, and it is used in the fastest and most powerful cars as well as in many of moderate power.

The third shaft, which is thus driven in either direction and in the forward motion at any one of three or four speeds, continues backward after leaving the change-gear case and carries a bevel gear on its rear end. In many cases this end runs only to a point somewhat back of the middle of the car, where it engages with a bevel gear on a shaft running across the car and projecting beyond the frame on either side, each end carrying a sprocket. In line with each of these sprockets is a larger sprocket attached to the inside of the spokes of the rear wheel, a chain connecting the two. In connection with the bevel gear on the "counter-shaft" or "jack-shaft" is a differential, the rear axle being thus undivided and the wheels turning on it as in a horse-drawn carriage. This double chain drive is found on most of the foreign cars used in this country as well as on some American ones. Another

frame of tubing, channel bars or pressed steel, sometimes "armed" or reinforced by wood to impart a certain amount of rigidity. No attempt is made, however, to obtain a frame which will be absolutely rigid and unyielding, as is the foundation of a stationary engine, but a certain amount of distortion is anticipated from the start. The main shaft and the clutch shaft are both quite short, and the conical



FOREIGN TYPE MOTOR FRONT TONNEAU.

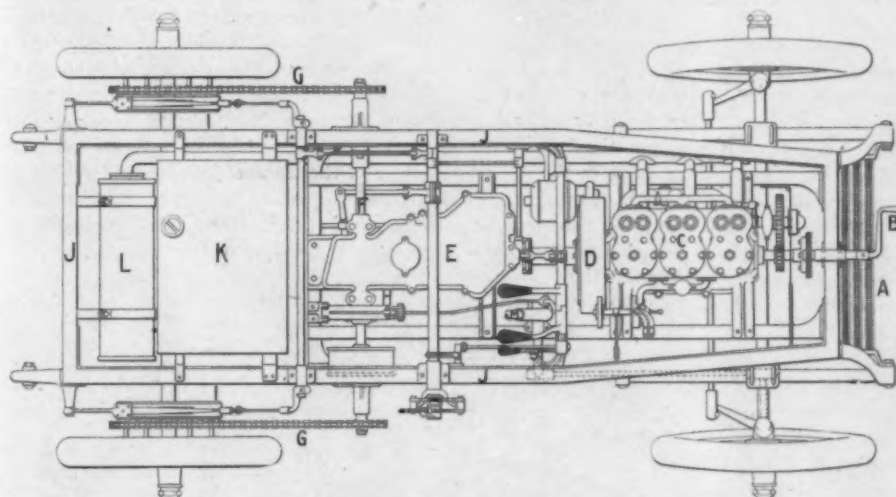
clutch allows of more or less spring without loss of power. Where the transmission is direct to the rear axle the third and longest section of the shaft is made with "universal joints" or "cardans," which allow a considerable amount of play without friction on the bearings, which, by the way, are usually fitted with balls. The "jack-shaft" is fitted with "claw-couplings," which without the range of

make plain the general principles of the application of the various powers to road vehicles, for a fuller discussion of the innumerable details of the design and construction of the internal combustion motor, and of those parts such as the differential and the steering gear which are common to all motor vehicles, it is only necessary to refer the reader to the series of papers on "The Gasoline Vehicle in Detail," which was begun in THE AUTOMOBILE AND MOTOR REVIEW of June 7 and closed in the issue of December 13.

THE CAR ON THE ROAD.

The driver of a gasoline car is called on to face very different conditions from those attending the steam car. His first thought naturally is to his tanks, to make sure that both gasoline and water tank are full, or at least adequately supplied for the proposed run. In addition to this it is most important that there shall be an ample supply of lubricating oil and that the reservoir and all pipes are in perfect order. Then, too, there is the storage battery, whether or no a dynamo be carried. Once assured, however, of the proper supplies of gasoline, water, oil and electric energy, the mind of the driver is at rest on these points for an indefinite time; he can count on running for a long distance without the necessity of renewing his supplies. Instead of figuring on gasoline and water within the next thirty miles or possibly less, he can take his chances on two or three times that distance.

With the car and motor in proper condition there is no loss of time in starting, a turn of the crank connected to the main shaft of the motor—from the seat in some of the small cars, but usually from the ground before mounting—should set the motor in motion, though sometimes it does not. The motor will, of course, be disconnected from the driving mechanism on starting, after the driver is once in his seat it merely remains for him to throw in the clutch and the car is ready to start. There is nothing in the line of gauges and water-glasses to engage his attention, no fire nor boiler to trouble him, but, on the other hand, he is called upon to manipulate a far more extensive and complicated system of levers and pedals. The exact arrangement and functions of these differ in the various types of car; in the small cars they are few in number and simple of operation, but their number and complexity increases with the speed and power and with the amount of "flexibility" or range of speed and control of the motor. By means of the devices for varying the quality and quantity of the mixture of vapor and air, for advancing or retarding the time of the explosion of the electric spark, for controlling the operation of the automatic governor, much may be done to obviate the initial defect of the explosion motor to approximate it to the flexibility of the steam engine and to improve



PLAN OF MOTOR FRONT TONNEAU TOURING CAR.

A Radiator.
B Starting handle.
C Motor.
D Flywheel.

E Change gear case.
F Counter-shaft.
G-G Side chains.
H Band brake.

J-J Sides of frame.
K Gasoline tank.
L Muffler.

system of more recent date dispenses with the "jack-shaft" and chains, the third shaft being carried as far back as the rear axle, with which it connects by means of a bevel pinion on the shaft and a bevel wheel on the case of the differential.

THE FRAME OR "CHASSIS."

This mechanism, which is necessarily of considerable length, extending from front to rear of the car, is all carried on a strong

motion of the universal joint give a certain amount of flexibility.

The theoretical defects of this arrangement, as in such details as the meshing of the gears while in motion and the great length of the transmission system, have been largely mitigated by excellence of mechanical construction and by special skill in planning.

The object of the present paper is to

it in effective working and in economy of fuel.

Starting with the light car, the beginner will find no special difficulty in familiarizing himself with the controlling mechanism and he should soon be able to operate it with reasonable facility. When once he has mastered it perfectly and acquired sufficient self-command and confidence in running, he is prepared to take up the more complicated machines. Should he elect to begin with the latter he will find it no very difficult task to acquire the practical management of the car at moderate speeds, after which it is merely a matter of practice and care before he is competent to try the higher speeds, to run in city streets, and then to so control his motor as to get the highest possible results in even, quiet running, perfect control under all circumstances, and economic consumption of fuel and lubricating oil. It is safe to say that to most men, even if not of strongly marked mechanical tastes, the work will be interesting in the extreme, and the reward will be fully worth the labor expended. It must not be supposed that the path is free from serious difficulties, the internal combustion motor in itself probably presents more unknown problems than any other piece of modern mechanism, to which must be added the difficulties of electricity, and the patience of even experts is often severely tried, but in spite of all this the gasoline car of today—and we may confidently expect great advances in the immediate future—is one of the most practicable and serviceable means of transport.

"The Lightning Conductor."

In "The Lightning Conductor," a breezy novel by C. N. and A. M. Williamson, the automobile tourist could find a new Baedeker. It concerns the adventures of a young American girl, who, with her maiden aunt, starts a tour of France on a cranky machine. An Englishman of family and wealth comes to their rescue when the auto had broken down, and allowing himself to be considered a professional, is engaged as driver and courier, becoming "The Lightning Conductor." The descriptions of familiar highways and rare byways in Provence, Spain, Italy, Capri and Corsica are pervaded by a sprightly humor. The book is issued by Henry Holt & Co., New York.

Ascending Mt. Wachusett.

Dr. Appleton H. Pierce, of Leominster, and C. L. Grout, of Orange, dispute the honor of first ascending in an automobile to the top of Mt. Wachusett, the highest point in New England east of the Connecticut River. Dr. Pierce also says that Roscoe Bicknell, of Worcester, preceded Mr. Grout, having made the trip in the summer of 1901. At present the Wachusett Park Commission has placed restrictions against automobiles climbing the mountain side.

Official Report of the A.C.A. 500-Mile Reliability Run.

The final report of the contest committee of the Automobile Club of America on the recent reliability run appeared last week in the form of an octavo pamphlet of over 100 pages. It contains much that will be interesting to manufacturers and to the participants in the run, and it forms a complete and permanent record of the event. The general results, the record of winners and much of the subject matter of the report have already been published, the only new matter being the individual records of each car as compiled from the observers' books, with a summary of the causes of stops and a table of average speed for every stage. A separate page is given to the record of each car, some few unfortunates requiring two pages for the full catalogue of their troubles. The data relating to each car—names of maker and observer, weight, etc., as given in the tables accompanying the first report of the contest—is supplemented by lists of causes and durations of all stops, and memoranda of work at controls. But the causes of stops, as well as the work of adjustment and repair, are described in the brief words of the official observers, which usually fail to convey an accurate idea of the source of trouble, and can serve as memoranda only to those who happened to know the circumstances surrounding each accident. As material upon which to build general conclusions in regard to automobile construction or operation of interest to the public or the industry, all of this lengthy matter is, practically without value, and the printing of it in the report signifies only the conscientious thoroughness of the contest committee in presenting all the facts with which it had to deal. It does not add an iota to the sum and substance of the information previously at hand, which was presented in this publication immediately after the close of the event, but rather accentuates what the automobile world has already discovered, namely, that "reliability contests," as heretofore conducted, demonstrate the reliability and efficiency of automobiles only in the most general and indefinite manner, but do not permit close discrimination between excellent, good and indifferent machines except in those rare cases when certain models repeat an excellent performance in a succession of contests.

Under these circumstances the official report can be made the basis for nothing more than a recapitulation of the event and its results.

CONDITIONS OF THE CONTEST.

The object of the run from New York to Boston and return, a total distance of 488.4 miles, was to test the reliability of the cars under average service conditions,

as nearly as these could be produced by design. It is manifestly impossible to produce in an event of this kind under arbitrary rules and a set program the same conditions as would be met by an individual touring for pleasure. The mere necessity of adhering to some system of competitive marking and of prize awards of itself alters the whole problem. It must be borne in mind that, for instance, many of the cars are selected and prepared for the task, thus representing a higher perfection than the average car which tours under private ownership; the operators are in many cases skilled professionals, with ample shop experience, working under a strong stimulus to make a record; on the other hand, a stop for some trivial cause, such as must be expected at any time in the most perfect car, may mar the technical score of the best.

The system of scoring by points is reasonably perfect in general plan, and with each year it must improve in detail, but at the same time it can never give an absolutely fair record of performances. In estimating the awards it must be taken at its face value, and an inspection of a few of the individual records will show that this is in no way a true indication of the service qualities of the cars. It is safe to say in a general way that the honors went to the best cars and the most skilful, careful and earnest drivers, but when it comes to the two important questions of the reliability and practicability of the motor car as offered for sale today, and the number, nature and causes of failures, the official summaries fail to give satisfactory results and it is necessary to go back to the face of the returns.

RESULTS AS OFFICIALLY TABULATED.

The official summary is as follows:

An analysis of the total number of stops from all causes due to the mechanism of the car (including tire troubles and stops for water and gasoline) of the 67 cars receiving certificates is as follows:

Gasoline Cars—Finished, 49, of which 6 had no stops, the remaining 43 having stops as follows:

GASOLINE MOTOR VEHICLES.	
	Per cent.
Ignition	26
Water Circulation	11
Stalled Motor	10
Tires	10
Valves	10
Accidental Stops	6
Carburetor	5
Transmission Gears	4
Springs	2
Gas Connections	2
Out of Gasoline	2
Lubrication	2
Wheel Bearings	2
Chains	2
Clutch	2
Brakes	1
Crank Shaft, Muffler and Steering Gear	2

STEAM CARS.

Finished, 18, of which 1 had no stop, the remaining 17 having stops as follows:

	Per cent.
Water and Gasoline.....	75
Tires	9
Air Pressure (all in one car).....	5
Water Connections	3
Lighting Fires	2
Low Steam	1
Water Glass	1
Lubrication	2
Brakes, Chain and Gasoline Connections.....	2

100

CAUSES OF WITHDRAWAL.

Seven cars withdrew for the following reasons:

- B 6 Foster, broken crank shaft.
- B 14 Autocar, damaged gear shaft.
- B 15 Ward-Leonard, jaw couplings between engine and speed gear broken, crank shaft bent.
- C 50 Neftel, defective water circulation, hot engine.
- A 54 De Dion-Bouton, broken steering gear.
- B 69 Fredonia, damaged transmission gear.
- A 74 Buffalo, broken connecting rod.

ACTUAL WORK OF THE CARS.

It would be difficult to deduce from the above any conclusions as to the reliability of the cars, the chances of accident from any one cause to the average owner in touring, or the directions in which to seek the remedies for such defects as still exist.

It is evident, for example, that one important factor has been absolutely disregarded in the official analysis. It gives the total number of stops and the percentage to be assigned to each class of causes, but in failing to give the number of vehicles represented in each of these classes the figures have been rendered, if not misleading, at least inconsequential. A single car with, say, ten stops due to faulty ignition, would add greatly to the percentage ascribed to this cause; yet the fault in such case would be with the construction or condition of that particular car and would not indicate the condition of the ignition methods of the industry in general, considering that the majority of the cars had no stops from this cause. It would be different if the analysis showed a large number of stops from one cause distributed among a large number of vehicles. In that case the indication would be one of faulty construction generally adopted.

New and complete tables showing the proportion of stops from the various causes are in course of preparation to be presented in a subsequent issue, accompanied by further analysis of the data and a complete map showing the course continuously from New York to Boston.

THE INDIVIDUAL PERFORMANCES.

Turning to the individual records, we find certain broad results which may be of real value. The total number of entries was eighty, of which seventy-five started from New York. Two of these broke down early in the contest, one within the first hour, the other before the noon control. All the rest reached Boston, but five withdrew on the first or second day of the return. A careful inspection of the records shows that, while but seventeen

cars made clean scores for the non-stop run, a very much larger proportion covered the long course in a way that may be rated as perfect for all practical purposes; that is, such stops as were made were due to such slight defects or accidents as may be looked for even in the best of machinery, or to the fault of the driver, all being capable of remedy on the road with ordinary tools and little loss of time. The cleaning or even replacing of a spark plug, the mending of a chain, the flooding of a vaporizer, or the failure to turn on the gasoline before starting, are samples of the minor causes of stops which mar many records. The list shows a total of fifty cars—68 per cent.—which made the run without serious defect or trouble. Next to these are eight cars whose records may be classed as "poor;" and then nine whose records are positively bad.

NUMBER AND NATURE OF BREAKDOWNS.

Taking first the breakdowns and accidents, they are in detail as follows, the cases. The Foster car, B 6, steam, made full particulars being missing in some an average of fourteen miles over every stage to Hartford on the return trip, there breaking the crank-shaft as she started at noon. She stopped once to tighten lubricator connection, once for ten seconds to open check valve, and once to regulate the vaporizer nipple. She attempted to make the run of 96.6 miles from Springfield to Boston on a single charge of gasoline, taking none at Worcester, and ran out of fuel as she neared the Boston control, being pushed in.

The Autocar, B 14, gasoline, lost nearly twenty minutes in three stops on the first day to clean spark plug and adjust the coil, then missed all controls from New Haven to Boston, no record being made of stops and causes, but made the run back to Worcester, withdrawing on account of a damaged gear shaft. The Ward-Leonard car, B 15, gasoline, made three stops, one to change spark plug, one of six seconds from skidding on wet pavement in Worcester and one of forty-five seconds from some unknown cause. On the return trip she reached Meriden with shaft bent and couplings between motor and speed gear broken, being compelled to withdraw. The Neftel car, C 50, a combination of gasoline motor and dynamo, was a new car and met with divers mishaps, apparently due to the experimental nature of the machinery; she reached the first control late and withdrew.

The De Dion motorette, C 54, gasoline, met with bad luck, being wrecked in steering clear of a dog in the road near New Britain; she was repaired and made her way through to Boston, the mended part again giving way, but she missed all controls on the third day and withdrew. The mishap was apparently in no way due to construction. The Fredonia car, B 69, gasoline, had trouble first with the heating of the transmission gear and then with a

broken screw in the clutch, having to drill it out; she also threw off the front tire, punctured right rear tire and then replaced tube in left rear tire. She withdrew at Worcester on the return trip on account of a broken pump and damaged gear. The Buffalo car, A 74, gasoline, broke her connecting rod shortly after the start; due, it is claimed, to the poor work of a repairman in fitting a new rod for the run.

MISHAPS OF FINISHING CARS.

Of the cars which went through, several met with ill-luck, notably the Haynes-Ap-person, B 12, gasoline, which ran into a ditch in order to avoid a collision with another car, losing three hours in repairs and sustaining some permanent injury. Another car which was very unfortunate was the Darracq, B 44, gasoline, which ran badly all the first day through the presence of a piece of metal in the cylinder, the inlet valve being broken. On the third day the piston broke and was replaced by one specially shipped from New York. She arrived in Boston on Sunday afternoon and made the return trip with an average of fourteen miles for every stage. The trouble was apparently exterior to the mechanism of the car. The Knox car, B 46, gasoline, an old car that has run many thousand miles and taken part in many contests, damaged her crank-shaft on the first day and ran through to Springfield on the second night, making fourteen miles over every stage but two; the previous record of the car indicates an accidental damage. The Italian car F. I. A. T., B 49, gasoline, started on the run with a broken gear case and had trouble from this cause throughout the run, the bearings forming part of the case. She finally stopped within a mile of the finish at New York. Another car that suffered from exterior causes was the Fournier-Searchmont, C 67, the counter-shaft and distance rod being bent on the first day by a boy's cap thrown into the chain and carried over the sprocket. It was impossible to straighten the counter-shaft during the run, it ran out of true and caused further trouble with the chain. In some of these twelve cases the trouble is clearly exterior to the car and the run, but in others it is doubtful whether it is due to faulty construction or to mere mishaps.

CAUSES OF FAILURE.

An examination of those records classed as "poor" fails to disclose any one predominating defect, or the general failure of any particular part; it seems rather that the trouble in each case was due either to the operator alone, or, if to the car, to general carelessness in adjustment of small parts. A record that is perhaps representative of this class reads as follows: Vaporizer flooded; broken stop-cock and loss of gasoline; gasoline feed tube broken; broken wire, also friction pulley to pump; overheated motor; five separate stops in all. As this car was of a stand-

ard make, the record would indicate lack of care in maintenance and handling rather than faulty design and construction.

A similar inspection of the "bad" list shows several cars which evidently suffered through faulty design, construction or both, but in most cases the cars are of well-known makes, identical with others which have scored successfully in the run, and the long list of troubles of all kinds indicates bad operation or previous abuse of the machine. One gasoline car of standard make, mate to a car with almost perfect record, has the following list of ten stops, in all, over two hours lost: Water supply; cooling motor (two stops); examining front axle; replacing steering knuckle; replacing valve packing; cooling motor; repairing weak spring; repairing inlet pipe; repairing weak spring.

TIRES AND THEIR TROUBLES.

Taking the complete list of starters and including those cars which dropped out toward the end of the run, the records show that 51 sets of tires went through in perfect condition so far as stops on the road were concerned. Changes of inner tubes, outer coverings or tires to the number of 13 were made within the controls. In the other cases while there were two or three cars which reported continued and serious trouble with tires, nearly all were limited to occasional pumping up of flat tires and repairs or ordinary punctures. Recognizing the liability of every rubber tire to puncture by nails and similar obstacles, the practical showing of the tires in this contest may be classed as very good. In some places the cars were compelled to run over partly made roads with very bad surfaces of broken stone, on which the upper layer was not yet laid. Some of the replacements were due to caution and not to real necessity. Though there was no penalty for "tire troubles," every one was anxious to make a clean score with no stops, even unpenalized, for the entire run.

SPEED RECORDS.

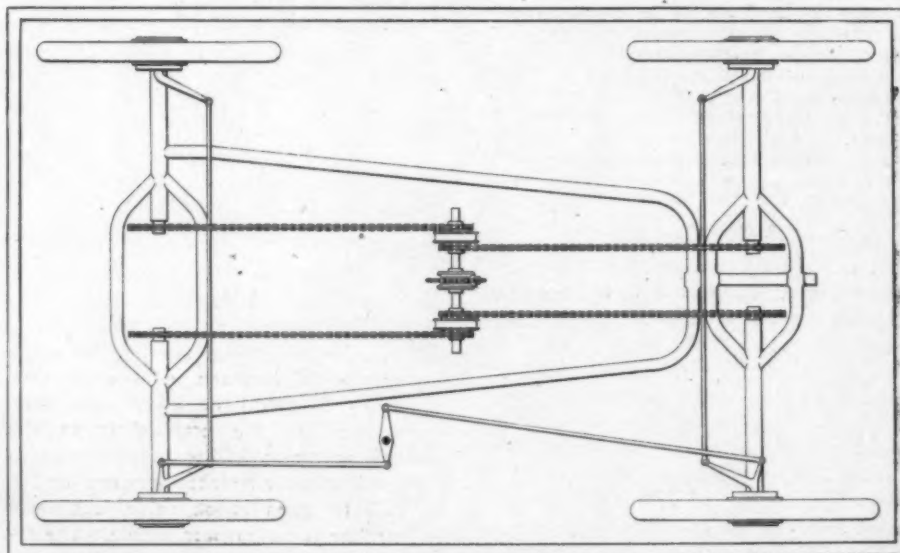
Though the speed averages for every car in each of the twelve stages have been accurately computed—a work of no small magnitude—they mean very little, and the question of speed may be entirely excluded in a contest of this kind. As a matter of fact, the legal speed limits are far below the powers of nearly every car, and there would have been a material decrease of troubles of all kinds if the speed could have been raised to 20 miles instead of 14. This average was made by 42 cars, and nearly all that fell below it did so from some accident which partially crippled them.

A private traction engine road, twenty miles long, is being built in Siskiyou County, Wash., by the Westoner Lumber Co., which is unable to ship its 4,000,000 feet of lumber by the Scott-Van Arsdale Railroad, and will haul the output to its mills to Mott by traction engine.

COTTA FOUR-WHEEL DRIVE FOR LIGHT VEHICLES.

One of the most persistent experimenters with and strongest advocates of the four-wheel drive as applied to light automobiles is Charles Cotta, president of the Cotta Automobile Co., of Rockford, Ill. The accompanying illustrations show the general construction of the running gear now used on the Cotta steam carriage and which is said by Mr. Cotta to have in

tional view of one of the hubs shows how the wheel is mounted on ball bearing on a sleeve, so that it may be equipped with a double knuckle joint for both steering and driving. The steering joint, of course, attaches to the non-rotary sleeve, while the driving joint attaches to the annular flange or sleeve drawn within the hub shell. The steering connections that cause the four wheels to be uniformly moved so that, in turning the vehicle, the rear wheels follow in the tracks of the



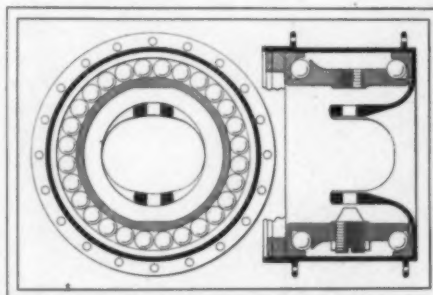
RUNNING GEAR OF COTTA FOUR-WHEEL DRIVE RUNABOUT.

actual practice warranted his warm advocacy of such drive.

The running gear is of tubular construction pivotally jointed at the front end to secure flexibility. Both axles are tubular and strongly trussed in their central portions. The wheel driving axles are within these and are driven by chains from the four respective sprockets on two differential gears mounted on a central countershaft. These differential gears are driven from a third differential between them and which receives the power directly by chain from the engine shaft. The power is thus divided evenly for the four wheels

front wheels, are clearly shown in the plan view of the running gear. In this construction the links are operated by a vertical side steering tiller post.

The complete Cotta vehicle is a steam machine whose boiler is placed at the front of the body, under an appropriate hood. The engine is under the foot board, its crank shaft being directly above the differential gear shaft, the latter being carried in a tight casing. The water, air and fuel tanks occupy the space under and back of the seat. The combined driving and steering hubs are stoutly built, the shell running on two rows of 1-2-inch balls, and, aside from the steering advantages claimed for four-wheel drive, they have by their construction the additional advantage of vertical steering axles exactly in the lateral center of the wheel or, in other words, directly above the tire contact line.



COTTA DRIVING AND STEERING HUB.

and utilized without the necessity of compensating gears on the axles.

From the axles the wheels are driven by universal knuckle joints which are used instead of the bevel gears ordinarily adopted for four-wheel drive. The sec-

Of the many mechanical toys sold on the sidewalks at Christmas time, the favorite this year in Boston is the tiny automobile run by clockwork. One of the popular patterns is a four-wheeler, a good miniature of the ordinary gasoline runabout; another is a three-wheeled pattern. Both have little tin drivers who seem to have almost as good control over their machines as some novices in real life.

The suggestion has been made that the bicycle policemen of New York City be mounted on motor bicycles.

MOTOR BOATS

Autos at Eastern Yacht Club.

There is a place on the North Shore, Boston Bay, where the automobile seems to be foreign to the surroundings. It is the house of the Eastern Yacht Club at Marblehead Neck. For the past two seasons motor vehicles have been growing more and more numerous at the club, and the row of sheds in the stable yard is as often filled with automobiles as with horses and carriages. When a party of motorists arrive together one might judge from the stable yard that the club was an automobile organization instead of a club for yachtsmen. It has come to be the custom to keep supplies for motor vehicles on hand at the club stables.

New Auxiliary Gasoline Cruiser.

As the result of an experiment with a Cape Cod catboat a couple of years ago, there is now building at the Newport Shipyard, Newport, R. I., a cruising yawl that promises to prove most satisfactory. The owner of the new boat, Dr. Thomas J. Charlton, of Savannah, Ga., after some sailing in a typical Cape cat of great breadth, installed a gasoline motor by way of auxiliary power and found the experiment most successful. The drag of the two-bladed screw apparently had no effect on the speed under sail, the motor took up but little room, and the boat was made far more serviceable in calm weather. Following up the same idea, Dr. Charlton recently ordered of William H. Hand, Jr., of New Bedford, a design for a cruising yawl of greater depth and less breadth and specially planned for a motor.

The yacht is 31 feet 1 inch over all, 22 feet 6 inches on the waterline, 9 feet 6 1/2 inches breadth, 3 feet 6 inches draft to bottom of keel and 6 feet draft with board down. The freeboard at the bow is 3 feet 1 1/4 inches, at lowest point 1 foot 9 inches and at counter 2 feet 1 inch. The overhangs are quite moderate and the whole form promises a staunch and easy boat for offshore cruising and rough water. The sail area is 719 square feet, a high and narrow mainsail on a pole mast, a narrow jib on a short bowsprit and a gaff mizen. The lead keel weighs 3,700 pounds and the inside lead weighs 1,000 pounds.

The motor is a 5-horse power Lozier, located directly abaft the after bulkhead of the cabin and beneath the floor of the cockpit, which is itself sufficiently above the water to be self-bailing. Only a short length of shaft is necessary, the motor is accessible from the cabin or from a hatch above, and it occupies space that would in any event be of little value. There is a large cockpit extending well aft, the rudder-head coming up through the floor,

and as in so many modern yachts there is a narrow space of deck between the cockpit and the after end of the house, thus leaving three deck beams uncut and materially strengthening the vessel. The cabin house is over 12 feet long and with a side over 12 inches high and a good crown to the roof it gives nearly 6 feet headroom. As the yacht will be used in a warm climate a skylight is fitted in the roof, with a large hatch in the deck between the house and the mainmast. The cabin proper is about 8 feet long, with a large sofa locker on each side, and forward of it is the toilet room. The fore-castle is fitted with icebox, pantry, etc.

The yacht is being built with special reference to durability, as she will be used in warm Southern waters, the centerboard trunk will be sheathed with yellow metal.

well-equipped machine shop for the construction of gasoline motors, and a large shop for launch building, with auxiliary buildings for storage and other uses. The shops are equipped with powerful electric cranes for handling motors and hulls and with a complete narrow-gauge tramway system in addition to the railroad sidings for receiving supplies and shipping launches.

The original boat shops of the company at Bascom, Ohio, thirty miles from Toledo, have been maintained for the Western trade. The growth of the business, the demand from New York and also the demand for larger cabin launches than can be shipped by rail, have led to the purchase of six acres of land on Westchester Creek, just inside of Throgg's Neck, Long Island Sound, where a new



AUTOMOBILES IN STABLE YARD OF EASTERN YACHT CLUB, BOSTON BAY.

While rather powerful in some ways for single-hand work, she has excellent accommodations for two persons and can be easily handled by them.

New Lozier Shops at Throggs Neck.

Before the yachting season opens the Lozier Motor Co., of Plattsburg, N. Y., will be established in a third factory on Long Island Sound. The headquarters of the company were moved two years ago to Plattsburg, on Lake Champlain, just on the borders of the Adirondacks, where an extensive plant was established, one of its features being a 1,500-horse power electric power installation, driven by the water power of the Saranac River, and supplying power for the shops. These include a large foundry, a very large and

building shop is now under construction. This will be a one-story frame building, 60 feet wide and 200 feet long, fitted up for hull construction only, the motors being built in Plattsburg.

The company has thus far devoted itself to the perfection of the smaller sizes of two-cycle motors, but it is equipped for the heaviest class of work, and in the future it will push the medium and larger sizes, both two- and four-cycle. The old "fantail" model of launch has been abandoned in favor of the double-end of "torpedo-boat" type, which is meeting with much favor. Not only is the new type a very decided improvement in every way, but launch users have at length awakened to the fact and are demanding the newer model.

Correspondence

Solid Tires on Light Cars.

EDITOR THE AUTOMOBILE:

Sir:—Will you kindly request those who have used solid tires on Oldsmobiles or any other light gasoline runabout to give their experience in your valuable paper? I do not think that automobiles will be a success for most physicians until tires are used that cannot be punctured. A doctor in a hurry to see a case cannot wait half a day to have a puncture repaired. I am sure that solid tires can be used with care over rough roads without shaking up the passengers too much.

The only question to my mind is whether the vibration of the engine, which I believe is partly absorbed by the pneumatic tires, would, if solid tires were used, injure the motor itself.

Camden, N. J.

R. I. HAINES.

[We should be pleased to have the experiences of any who have tried solid tires on such light cars.—Editor.]

Effect of Automobile Antagonism.

EDITOR THE AUTOMOBILE:

Sir:—Enclosed please find a clipping from the daily *World* of an automobile accident or a damage suit in New Jersey. Could the owner of an automobile be compelled to pay for damages and personal injuries in New York State, if, while driving within the speed limit and complying with other requirements of the law, he should meet a team and they should run away, wrecking the wagon, injuring themselves and destroying the harness, although the driver of the automobile stops his machine as soon as he notices that the horses are frightened?

I am about to purchase an automobile, but wish to be clear on these points first.

SANFORD H. COONS.

Germantown, N. Y.

URNS TABLE ON HORSE OWNER.

Richard M. Willis, a wealthy resident of Englewood, N. J., was defendant yesterday in a suit for damages brought by Herbert Quinting and tried before Judge Dixon at Hackensack.

Quinting testified Willis's auto scared his horse and his wagon was upset, causing injury to his wife and himself.

Evidence for the defense showed Quinting was more frightened than his horse, which he drove into a ditch, causing the wagon to upset. Mr. Willis stopped his machine, helped Quinting and his wife from the wreck, ordered a carriage to take them home, and paid for all damage done the harness and carriage.

The jury non-suited Quinting.

[The driver of an automobile, or its owner, cannot be held responsible for damages caused by a runaway horse, or due to collision, provided he observes all the requirements of the law and is not guilty of carelessness or negligence. This is shown in the case quoted, in which the plaintiff was non-suited—that is, it was held, on the testimony submitted, that he

had no cause for action. The New York statute provides that "Every person driving an automobile or motor vehicle, shall, at request or signal by putting up the hand, from a person driving or riding a restive horse or horses, or driving domestic animals, cause the automobile to immediately stop and to remain stationary, so long as may be necessary to allow said horses or domestic animals to pass. This provision shall apply to automobiles going either in the same or in an opposite direction."—Editor.]

Calculating Motor Power.

EDITOR THE AUTOMOBILE:

Sir:—Recently I bought a copy of your book called the "Construction of a Gasoline Motor Vehicle," by C. C. Bramwell. I am well satisfied with the book, but I should like to know what horse power is the engine described in the book; also I should like to have a rough formula by

speed in the car described in Bramwell's book, the engine will run approximately 900 turns per minute when the car is going nineteen miles per hour, which is probably a fair estimate of its speed. Applying the formula we find that the motor should have about $4\frac{1}{4}$ horse power at this speed.—Editor.]

GASOLINE WAGON IN DRY GOODS DELIVERY SERVICE.

The Siegel-Cooper Co. of New York city has had four Daimler gasoline wagons in service during the past summer. The first was put on in the latter part of June, and the last early in September. They are each of 12 horse power, with a capacity of four tons. These are used on the longest routes that are too long for horses, and for delivering only the heavier goods. They deliver as far as Bridgeport, and can make a round trip to Stamford in



GASOLINE WAGON USED BY THE SIEGEL-COOPER CO. FOR HEAVY DELIVERING.

which the horse power of any size of gasoline engine can be determined.

Columbus, O.

P. O. MARSH.

A good formula, convenient to apply and giving with sufficient accuracy for most purposes the power which ought to be obtained from a gasoline engine of a given power and speed, is that given in the *Gas Engine Hand-Book*, by E. W. Roberts. It is as follows:

$$B. H. P. = \frac{D^2 \times L \times N}{18000}$$

in which D equals the diameter of the piston in inches, L equals the length of stroke in engine and N equals the number of revolutions of the crank-shaft per minute. This, of course, is the power of one cylinder and should be multiplied by the number of cylinders for a multiple cylinder engine. As you will see by working out the ratio of engine speed to axle

a day, a distance of seventy-two miles.

Manager Mabie, of the shipping department, to whom the representative of this paper was referred by Mr. Cooper, stated that, while he is keeping a record of the work done by these vehicles, for comparison with the horse wagons, he preferred to not make such data public until some future time when they had been in service long enough to make such figures reliable. It is difficult, he said, to obtain drivers who fully understand the mechanism and operation of the vehicles and there had been some trouble at first through the use of a poor quality of fuel and lubricating oil. The latter difficulty has been overcome and he thought that the former soon would be also, as the men become more used to the wagons. All of the wagons are stored and cared for at a station on Thirty-eighth Street, where they are in charge of a man from the Daimler factory.

Foreign

CLUB AND MOTOR NEWS FROM EAST OF THE RHINE.

ARMY TRAINS SOLDIERS TO DRIVE.

Conflicting German and Austrian Shows—A Motor Paper Chase Across Country—France Would Make Speed Records on a German Course—Stage Lines in Servia.

BERLIN, Dec. 8.—An interesting subject was discussed at one of the debating evenings of the Austrian A. C.—the want of really experienced chauffeurs. During discussion, an army captain divulged the fact that no less than forty soldiers are being carefully trained, both in theory and practice, for the manipulation of the six motors at present in use in the army, and with an increase of cars, the number of men being trained to serve them, would naturally also rise.

This brought out the promising possibility that eventually the army would train a large number of men in this branch of work, who, when discharged from the military service, would make invaluable servants for owners of automobiles, just as old artillerymen and cavalry soldiers are now greatly preferred as coachmen.

The meeting called by the German A. C. for the last week in November interested itself principally in the motor-vehicle exhibition the club is arranging for March 8 to 22 jointly with the Society of German Motor Vehicle Traders. General Becker was elected president of the exhibition committee, while Director Freund is at the head of the technical commission. It is very unfortunate that the date of the show contemplated by the Austrian A. C. is fixed for exactly the same period as that of the Berlin club. Perhaps some arrangement may be arrived at, as one of the two affairs is sure to suffer under the simultaneous dates.

Count Schoenborn, president of the Austrian Automobile Club, who it will be remembered was the first person to ascend Vesuvius in an automobile, recently arranged for a "motor paper chase" across country on his estate, Schoenborn-Malabarn, near Vienna. A great many ladies and gentlemen accepted the Count's invitation, among whom were a granddaughter of the Emperor of Austria, Baroness Seefried, and the Austrian Minister of War, Herr von Krieghammer. The "hare" was the host himself, who in spite of having 45 minutes start allotted him, was run pretty close by the first "hound" home, Count Boos-Waldeck, in a 20 horse power Mercedes. The route was variegated, the 30 kilometers leading over ploughed fields, meadows, shrubs and every other kind of surface available in the Schoenborn estate.

The German A. C. is seconding the pro-

posal of the Austrian Club regarding international racing regulations and has called a meeting to discuss this project, as well as a proposal of the Automobile Club de France to choose a route in Germany suited for the putting up of official records.

Count Zborowsky, who was intending to drive a Mercedes car in the coming Gordon-Bennett cup race, has altered his mind and will steer an English make, probably a Napier machine, England being the country of his adoption.

A French firm has been granted the right to open up lines of motor traffic for the conveyance of persons and goods throughout Servia. Four routes are to be opened; as soon as the undertaking is in working order and the distances will be gradually extended in all directions.

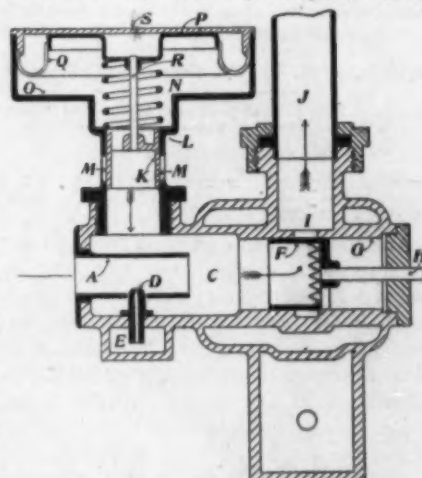
The Society of Austrian Cycle and Motor Vehicle Dealers has set up a most promising program for next year, among others being several long-distance events, all having Vienna as the start, and an exhibition of cycles and motors for November next. Attention will be chiefly directed to motor bicycles which are now so deservedly popular on the Continent. As all the chief dealers will be fully represented, the show should prove a very important one.

PANHARD'S NEW AUTOMATIC KREBS CARBURETER.

With mechanically actuated admission valves and a system of throttling which produces rarified explosive charges in the cylinder the necessity arises quickly for accurate regulation of the air supply when the engine is running far below its normal speed on an extremely small supply of gasoline vapor. Unless the air supply is regulated better than is possible with the average carbureter, even of modern improved types, frequent misfires result, especially at the transitions from one motor speed to another. Now, Mr. Krebs, the well-known constructor and director of the Panhard Company, has designed a carbureter in which the air supply is controlled by the piston speed in a more accurate manner. His method may be described with reference to the accompanying illustration, as follows:

The carbureter consists of three parts. The first consists of an air inlet A, communicating with the mixing chamber C. The spray nipple D descends into the receptacle E, which communicates with the float chamber. The second part forms a regulator consisting of a piston F moving in the cylinder G. The piston rod H is actuated by the centrifugal governor of the engine. The cylinder G, moreover, is in communication with the motor cylinders by the port I and the pipe J. The third part is the extra air inlet consisting of another piston K in the cylinder L, which communicates with the chamber C. The piston K opens and shuts the ports M M

in the cylinder L, and the rod R is joined at its upper extremity to a piston P of smaller diameter than the large cylinder O in which it moves. The periphery of the piston P is connected with the sides of the cylinder by a loose elastic diaphragm Q. A small aperture S admits air above the piston and diaphragm. The piston is kept in position by a spring N. Its operation is as follows: The piston F varies in travel according to the speed of the motor, the suction of which draws gasoline through the pulverizer D and air through the orifice A, and at the same time tends to draw down the piston K, and uncover more or less the air ports M M, which are closed when the piston P is kept up by the spring. When, therefore, the motor is running at high speed, the piston F has a long travel, and takes in a large quantity of spirit, but at



NEW CARBURETER USED IN PANHARDS.

the same time, as only a small fixed quantity of air is admitted through A, the piston K is sucked down to uncover the ports M M, which admit the necessary quantity of air for the mixture. As the motor slows down, the piston F, actuated by the governor, has a shorter travel, and the parts M M are only partially opened during suction strokes; and when the piston F is at its shortest travel, the suction is insufficient to overcome the resistance of the spring N, with the result that the ports M M remain closed, and air is only admitted through A in quantity proportionate to the smaller admission of spirit through D. The air is thus kept strictly proportionate to the spirit, and the mixture is uniform at whatever speed the motor may be running.

This carbureter was the subject of a paper read before the Academy of Sciences of Paris last month, and its design was considered a notable advance in automobile construction, but there seem to be reasons for believing that it could be greatly simplified, and that its results may be obtained by mere refinements of several existing carbureters whose designers have aimed to control the air supply by simpler means.



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AMERICA AT THE PARIS SHOW.

America has her own problems to solve in automobile construction and they do not coincide entirely with those which have so far been recognized as most important in France. Ours have had principal reference to economy of production, adaptation to the use of automatic machinery in the manufacture, convenient operation by persons of moderate skill and fitness for poor roads. We have had all these requirements in mind since the beginning of the automobile movement in this country. Capital has considered them all before venturing into the industry. Engineers have hesitated to take charge of forms of manufacture in which these requirements were not met.

In France, on the other hand, difficulties have been surmounted one by one. Speed was the all-sufficient test. In the beginning the French manufacturers were willing to have five operating levers on a car if it showed speed in the care of a skilled driver. They had enough good roads to permit them to keep away from the bad ones. A large rich leisure class, many of them of technical education, supported the experimental movements of the industry regardless of cost. They evolved a constant-speed motor first and the wretched operating mechanism was accepted with it; then the speed-change gear and clutch arrangement were energetically improved, and when this had been accomplished attention was again turned to the motor and its accessories with a view to obtaining a flexible power and graduated motor control. But all the time speed was the accepted test.

Our requirements were not recognized as applicable to a French Automobile until the last mentioned stage was reached,

and then largely because the automobile movement had spread to other classes of the population than those who first embraced it.

It may be a question whether the greater intelligence was shown here or there in the conception of automobile problems, but it seems well assured that the European idea and ours have finally met on common ground without any change on our part. At the same time it should perhaps be conceded that the systematic progression from one problem to another—whether designed or determined by circumstances—has proved fully as practical as our attempt at producing the ideal automobile at once. It created a solid foundation for improvements, while we, in many instances, floundered without definite aims, more or less inclined to accept the temporary French solution offered us as sufficient for our needs, which it has never been before and perhaps is not in all respects even to-day.

The reports from the Paris Automobile Show furnish many indications that French manufacturers are now in many instances actually producing gasoline motor vehicles of a type which scores of American constructors have had in mind, but which lack of capital and engineering data—especially with regard to the strength of materials—have often prevented them from producing. Priority in a new field, which means an accumulation of valuable shop practice and road experience, together with the lessons of long distance road races and a rather frank co-operation between the members of the engineering fraternity, have given France an advantage, which our better idea of the ultimate type was not of sufficient strength to overcome.

But this apparent fact, that France this year sets us a better example for emulation than ever before, has not been generally recognized, as yet. It may indeed not be proved absolutely true. It is doubtful whether excellence of quality is combined with economy of manufacture, and whether we can accept the French carriage styles. It is almost certain that the speed qualities are still too strongly accentuated in the French cars to suit our conditions.

To the general recognition of the divergence in purpose which until this year has separated the European industry from ours, is perhaps due our lack of representation at the Paris exhibition. It seems that only one American manufacturer of complete automobiles has made a prominent display in the Grand Palais, and he a maker of steam vehicles of a type which is entirely our own.

For this meagerness of representation in the actual product our consolation must be that our ideas and ideals are much better represented, and that the best types of French cars are now practically an indorsement of those requirements upon which we have always insisted.

There should in this condition of affairs be the strongest inducement for American capital and American engineering talent of the first order, to step resolutely into the American automobile industry and help it to accomplish everything which it has aimed to accomplish, and in which it has partially failed only for lack of faith among the public and among the leaders in finance and science.

If this support had been forthcoming at an earlier date, we should have seen no makeshifts in the dimensions of gear wheels; they would have been calculated by trained engineers with reference to their work. No compromise in the quality of castings would have been tolerated. More liberal pecuniary allowances would have been made for the enlistment of artistic skill in the design of carriage bodies. Our excellent facilities for shaping sheet metal in any desired form would have been exploited for the improvement of our vehicle frames, rather than permitting the extensive use of angle and channel iron of stock patterns and dimensions, to say nothing of strap iron and inferior alloys.

On these points and in careful workmanship the best European manufacturers have excelled, and though the result was more expensive construction at first, economical production is now within their reach. Our mania for "getting rich quick" and doing business on too small capital, has played us a trick, but it is fortunately still time to mend this error in methods, and the best proof in this respect is furnished by the signal successes accomplished by a half dozen American manufacturers whose methods have been conservative and scientific and whose vehicles ply our poor roads day after day and month after month without necessity for repairs. In all respects—except artistic outlines—the makers of these vehicles, both steam and gasoline, have accomplished as much as any French manufacturer, because the problem before them was rendered more difficult by the isolation of their position and the necessity for producing a vehicle at once which could cope with poor roads.

If the Parisian Show surprises us by the great improvements effected through apparently minor refinements, worked out during the past year, it requires only a casual survey of the reports which have reached us so far to discover that these improvements could have been our property, if conditions had permitted us to carry out American ideas in adequate fashion. Throttle control over the motor has been the single aim of many American motor designers for years, and was accomplished in a measure by several of them, before it engaged French or English attention. Silent exhaust, which is now becoming a fad in France, was originated here. Devices for permitting gradual starting of gasoline vehicles and smooth driving on

the slow gears, by means of reducing the charge to the lowest requirement, were coincident here with the improvement of throttle control. Mechanically operated admission valves were attempted in American motors over three years ago, and failed solely from defects in workmanship and lack of capital. Three cylinder motors, which are now adopted with much success in at least two prominent French cars, are old in this country. Electric power transmission was represented here earlier than anywhere else.

If our industry, on the whole, has shortcomings in comparison with that of Europe, they are not due to lack of intelligence, but solely to a certain crudity of methods superinduced by lack of faith on the part of capital.

BALTIMORE CLUB PRESIDENT FORCES TEST CASE.

BALTIMORE, Dec. 20.—Automobiles cannot be excluded from the free use of any parks, squares or drives under the control of the Park Commissioners, according to a decision handed down by Justice White last Friday. The opinion was given in a test case forced by William Keyser, president of the Automobile Club of Baltimore, who on Thursday, while accompanied by the Chilean Consul, drove his automobile onto Green Spring Avenue notwithstanding notices prohibiting its use by heavy wagons and pleasure vehicles, other than those drawn by horses. He was promptly arrested, and when he appeared before Justice White the following day admitted he wanted to test the rule. The Justice held the arrest to be unwarranted, as the city statutes provide that the Park Commissioners shall not pass any rule or regulation excluding automobiles from the free use of the drives under their control.

Indiana Motorists Want Brick Roads.

Special Correspondence.

INDIANAPOLIS, Dec. 20.—A determined effort will be made by the automobilists of Indiana to induce the legislature to adopt the plan of State Geologist Blatchley for the building of many brick roads in this State.

Mr. Blatchley proposes that prison labor be utilized in making vitrified brick from the shale which is found in great quantities in several western counties in the State. He estimates that the brick roads will cost but a trifle more than the gravel roads and will be much more durable.

"In view of the number of automobiles which are coming into use," said the State geologist to your correspondent, "I think the representatives should take up this idea, abolish the contract labor system in vogue at the prisons and set the men to work making good roads."

Mr. Blatchley will prepare letters to the representatives and urge them to take up the plan and push it through next session.

STOP WATCH AND HONOR FOR BUTLER—TALK OF ROADS.

The participants in the recent Reliability Run, to the number of about sixty, gathered at the New York Athletic Club on December 22, the principal object of the meeting being the presentation of a testimonial to S. M. Butler, secretary of the Automobile Club of America. During the run the idea of such a testimonial was suggested by several of the contestants and observers, and a committee, of which C. H. Gillett was the moving spirit, took charge of the matter. The sum of \$450 was raised, through many small subscriptions, and a very fine stop watch was purchased.

Among those present were A. R. Shattuck, J. Dunbar Wright, John A. Hill, Harlan W. Whipple, Percy Owen, H. S. Harkness, E. E. Britton, George B. Adams and W. J. Stewart. W. E. Scarritt acted as toastmaster, with Mr. Butler as the guest of honor on his right. A very good orchestra played during the dinner. The speeches, including Mr. Scarritt's presentation and Mr. Butler's reply, were mainly humorous, but, by way of more serious business, Mr. Shattuck gave an interesting account of present and proposed Good Road work, and in particular the improvement of the main road entering New York City, including the paving of Jerome Avenue. He also stated that the Committee of Fifty had just agreed to recommend to the Board of Aldermen an increase of the speed limit to fifteen miles in those boroughs of New York City other than Manhattan. Mr. Britton spoke seriously, but with considerable humor, on the observance of the speed laws by the members of the club. Mr. Owen spoke of the experiences of the past run, and suggested such change of the conditions as would make the future runs of a higher technical value. As the first of the kind the reunion was a success, and similar informal events through the winter would do much to bring together the motorists of New York.

SYRACUSE CLUB TO BOOM SPORT AND ROAD IMPROVEMENT.

Special Correspondence.

SYRACUSE, Dec. 20.—The committee in charge of the annual election and banquet of the Automobile Club of Syracuse to be held at the Yates Hotel on the evening of January 5, has sent invitations to attend to several prominent citizens, including Mayor Jay B. Kline, Commissioner of Public Safety Charles Listman, Commissioner of Public Works A. R. Thompson, three members of the Highway Committee of the Board of Supervisors and Prof. John E. Sweet. The last-named will read a paper upon a technical subject of interest to automobilists. The club is preparing to make an aggressive campaign against cer-

tain companies in this vicinity that control toll roads and do not live up to their charters. Henry Walters, a young attorney and member of the club, has been elected official counsel of the club and will attend to the legal side of making the toll roads more passable. If the road companies do not improve their ways the club will be a strong advocate of State roads running parallel to the toll roads.

The club has been assured that Alexander Winton will race here if the State Fair Commission sets aside a day for automobilists. The club wants the commission to appropriate a sum sufficient to enable it to offer cups that will draw the greatest attractions. The club has revised its constitution and will boom the sport next season.

Speakers at A. C. A. Annual Banquet.

Highway improvement is to be the main topic of discussion at the annual banquet of the Automobile Club of America, to be held in the Waldorf-Astoria Hotel on January 24, during the New York automobile show. Invitations to attend the banquet have been accepted by such well-known good roads advocates as Senator W. L. Armstrong, of New York; Congressman W. P. Brownlow, of Tennessee, who introduced the \$20,000,000 national road appropriation measure; Congressman James S. Sherman, of Utica; W. E. McClintock, Highway Commissioner of Massachusetts; W. Pierrepont White, chairman of the standing committee of the Road Supervisors of New York; Edward A. Bond, New York State Engineer, and H. I. Budd, Highway Commissioner of New Jersey.

In the class of after-dinner speakers that are certain to make things interesting are Job Hedges, Augustus Thomas and Simeon Ford.

Good Roads Convention Committee.

At a special meeting of the executive committee of the National Association of Automobile Manufacturers, held in the office of the Association, on December 18, a special committee composed of John Brisben Walker, chairman, J. Wesley Allison and M. J. Budlong, was appointed to attend to matters pertaining to the good roads convention, called by the Association, to be held in Chicago during the week of the automobile show in the Coliseum, from February 14 to 21. The convention is called for the purpose of approving a bill to be presented to the present session of Congress to appropriate \$20,000,000 to be expended under the direction of the National Government. The \$20,000,000 is to be distributed in the various states according to population, upon application by any State or county, the State or county agreeing to furnish \$2,000 for each \$1,000 expended by the Government.

GOOD ROADS BUREAU WANTED BY MOTORISTS.

TEXT OF BROWNLOW BILL.

**Congressional Measure Appropriating \$20,000,000
Provides for Creation of Government Bureau
Having Authority to Pay Half the Expense of
Improved Highways.**

Indicative of the great interest taken in the subject of highway improvement by the automobilist and the automobile clubs are the facts that the annual banquet of the Automobile Club of America, to be held on January 24, during the New York show, is to be a good roads meeting, that the American Automobile Association has declared itself in favor of the trans-continental wagon road idea, and that the National Association of Automobile Manufacturers has called a good roads convention, to be held in Chicago at the time of the Coliseum automobile show, to approve a bill providing for the appropriation of \$20,000,000 to be expended by the federal government in the form of national aid for highway construction, on much the same lines as the State aid given by New York, New Jersey, Massachusetts and Connecticut to their counties.

So actively interested in the subject is President Shattuck, of the Automobile Club of America, chairman of its good roads committee, that he has asked for the publication in full of the text of the bill introduced at the beginning of the present session of the Congress by Representative Brownlow, of Tennessee, providing for an appropriation of \$20,000,000 for the creation in the Department of Agriculture of a Bureau of Good Roads, and to provide a system of national, State and local co-operation in the permanent improvement of the public highways. This bill, known as House Bill No. 15,369, and summarized by our Washington correspondent in the issue of December 13, reads as follows:

A BILL

To create in the Department of Agriculture a bureau to be known as the Bureau of Public Roads, and to provide for a system of national, State and local co-operation in the permanent improvement of the public highways.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That there shall be in the Department of Agriculture a bureau to be known as the Bureau of Public Roads.

Sec. 2. That the object and purposes of said Bureau shall be to instruct, assist and co-operate in the building and improvement of the public roads, at the discretion and under the direction of the Director of said Bureau, in such States, counties, parishes, townships and districts in the United States as shall be determined upon by said Director. The general policy of such Bureau shall be to bring about, so far as may be, a uniform system of taxation for road purposes and a uniform method of road construction, repair and maintenance throughout the United States, and to co-operate with any State or political subdivision thereof in the actual construction of permanent highways.

Sec. 3. That said Bureau shall be under the

management and direction of the Secretary of Agriculture, and shall consist of one Director of said Bureau, who shall receive a salary of four thousand five hundred dollars per annum; one assistant director, who shall receive two thousand five hundred dollars per annum; one chief clerk, who shall receive two thousand dollars per annum; one stenographer, who shall receive one thousand four hundred dollars per annum; one clerk, who shall receive one thousand dollars per annum; one messenger, who shall receive seven hundred and twenty dollars per annum; four field experts, who shall receive two thousand dollars per annum each; four civil engineers, who shall receive one thousand eight hundred dollars per annum each; four road experts, who shall receive one thousand four hundred dollars per annum each; one assistant, in charge of road-material laboratory, who shall receive two thousand five hundred dollars per annum; one engineer, who shall receive two thousand dollars per annum; one chemist, who shall receive one thousand eight hundred dollars per annum; one petrographer, who shall receive one thousand two hundred dollars per annum, and such other officers, agents and servants as the Director may from time to time require for the purpose of carrying into effect the provisions of this Act.

Sec. 4. That there shall be appropriated for the maintenance of said Bureau and the use thereof, out of any money in the Treasury of the United States not otherwise appropriated, the sum of seventy-five thousand dollars for the salaries herein provided for and for the following items: The general expenses of said Bureau; to enable the Director, under the direction of the Secretary of Agriculture, to make inquiries in regard to systems of road building and management throughout the United States; to make investigations and experiments in regard to the best methods of road making and the best kinds of road-making materials; to co-operate in the building of object-lesson roads in the several States, in accordance with the plan hereof; to employ local and special agents, clerks, assistants and other labor required in conducting experiments and collecting, digesting, reporting, and illustrating the results of such experiments; to investigate the chemical and physical character of road materials; to purchase necessary apparatus, materials, supplies, office and laboratory fixtures; to pay freight and express charges and traveling and other necessary expenses; to prepare, publish and distribute bulletins and reports on the subject of road improvement; to enable him to instruct and assist in the building and improving of the public roads and highways in such States, parishes, counties, townships and districts in the United States as shall determine to follow the plans and methods directed and determined upon by the Director of said Bureau; and to enable him to assist agricultural colleges and experiment stations in disseminating information on the subject of improved roads.

Sec. 5. That any State or political subdivision thereof, through its proper officers having jurisdiction of the public roads, may apply to the Director of said Bureau for co-operation in the actual construction of a permanent improvement of any public highway within the said State in the following manner: Every application for the co-operation herein provided for shall be accompanied by a properly certified resolution stating that the public interest demands the improvement of the highway described therein, but such description shall not include any portion of a highway within the boundaries of any city or incorporated village.

Sec. 6. That the Director of said Bureau, upon receipt of any such application, shall investigate and determine whether the highway or section thereof sought to be improved is of sufficient public importance to come within the purposes of this Act, taking into account the use, location and value of such highway or section thereof for the purposes of common traffic and travel,

and for the rural free delivery of mail by the United States Government, and after such investigation shall certify his approval or disapproval of such application. If he shall disapprove such application, he shall certify his reasons therefor to the public officer or officers making the application.

Sec. 7. That if the Director of said Bureau shall approve such application, he shall cause the highway or section thereof therein described to be mapped, both in outline and profile. He shall indicate how much of such highway or section thereof may be improved by deviation from the existing lines whenever it shall be deemed of advantage to obtain a shorter or more direct road without lessening its usefulness, or wherever such deviation is of advantage by reason of lessened gradients. He shall also cause plans and specifications of such highway or section thereof to be made for telford, macadam, or gravel roadway, or other suitable construction, taking into consideration climate, soil and material to be had in the vicinity thereof and the extent and nature of the traffic likely to be upon the highway, specifying in his judgment the kind of road a wise economy demands. The improved or permanent roadway of all highways so improved shall not be less than eight nor more than twenty-four feet in width, unless for special reasons it is required that it shall be of greater width. He shall, if requested by the application, include provisions for steel-plank or other flat-rail construction in double track.

Sec. 8. That upon the completion of such maps, plans and specifications, said Director shall cause an estimate to be made of the cost of construction of the road intended for improvement and transmit such estimate to the officer or officers from whom the application proceeded, together with a certified copy of said maps, plans and specifications, including a certificate of his approval of the highway or section thereof so designated as aforesaid.

Sec. 9. That after the receipt thereof the official making the application may file with the Director of said Bureau a second application, properly certified, stating that such highway or section thereof so approved shall be constructed and maintained according to the provisions of this Act.

Sec. 10. That in case the boundaries of such proposed highway shall deviate from the existing highway, the officials making the application must provide for securing the requisite right of way prior to the actual commencement of the work of improvement.

Sec. 11. That upon receipt of the application and certified copy of the resolution provided in section nine, said Director shall advertise for bids for two successive weeks in a newspaper published at the county seat of the county in which the road is to be built, and in such other newspapers as shall be deemed of advantage, for the construction of such road or section thereof, according to said plans and specifications, and shall award such contract to the lowest responsible bidder, except that he may in his discretion award the contract to the State or political subdivision thereof making the application, and except that no contract shall be awarded at a greater sum than the estimate provided in section eight.

Sec. 12. That one-half of the expense of the construction thereof shall be paid by the Treasurer of the United States upon the warrant of the Comptroller, issued upon the requisition of the Director of said Bureau, out of any specific appropriations made to carry out the provisions of this Act, and one-half of the expense thereof shall be paid by the State or political subdivision thereof making application for the co-operation provided for herein: Provided, That the State or political subdivision thereof from distributing the said one-half so that the State may pay a portion, the county a portion, and the owners of the land abutting upon said road nothing herein shall be construed to prevent

another portion: And provided further, That no money be advanced by the United States in payment of its portion of the cost of construction as provided for herein, except as the work of actual construction progresses, and in no case shall the payment or payments made thus prior to the completion of the work be in excess of eighty per centum of the value of the work performed, but in all cases twenty per centum must be held until the completion of the work according to the plans and specifications and to the satisfaction of the Director of said Bureau.

Sec. 13. That for the specific purpose of carrying out the co-operation and actual construction provided for herein and for the maintenance of said Bureau of Public Roads, there is hereby appropriated out of any money in the Treasury of the United States not otherwise appropriated the sum of twenty millions of dollars: Provided, That no State shall receive in aid of road construction out of any money appropriated for that purpose according to the provision of this Act a greater proportion of the total amount appropriated than its population bears to the total population of the United States.

LONG ISLAND CLUB ELECTION AND ANNUAL BANQUET.

An entirely new set of executive officers was elected without opposition by the Long Island Automobile Club at its annual business meeting held on the night of December 17 in the new quarters of the club in the house of the Lincoln Club of Brooklyn. The choice of president is, as the members put it, a "return to their first love," as L. R. Adams was the first president. The new list of officers is as follows: President, L. R. Adams; Vice-President, Lawrence Abraham; Secretary, Read Halliday; Treasurer, Edwin Melvin. Governors, J. Adolph Mollenhauer, Read Halliday, Nathaniel Robinson, L. A. Hopkins, F. G. Webb and Lawrence Abraham. Membership Committee, A. R. Pardington, W. H. Mafies, M. D., and E. C. Seed.

Reports of the president, secretary and treasurer and of the various committees showed the affairs of the organization to be in a satisfactory condition.

Nearly twenty-five members sat down to the banquet, at which A. R. Pardington acted as toastmaster. Addresses were made by L. R. Adams, F. G. Webb, W. W. Grant and others. Conspicuous among the decorations of the dining hall were the \$100 silver cup won by F. A. La Roche and the \$50 and \$25 cups won by L. P. Moores at the Brighton Beach race meet last summer.

Home for Toledo Club Soon.

The Toledo Automobile Club will have commodious and inviting quarters earlier than anticipated. Manager Charles M. Hall, of the Toledo Motor Carriage Co., has arranged for club rooms on the second floor of his new building to be erected on the north side of Madison Street, between Tenth and Eleventh Streets. The building will be three stories high, 40 feet front and 96 feet in depth. It will contain repair and store rooms for private vehicles, and will be ready for occupancy about April 1.

OPPOSITION TO STEAM BUSES BASED ON ABSURD GROUNDS.

Special Correspondence.

WESTERLY, R. I., Dec. 20.—While narrowness of the roads in Porto Rico prevented the successful operation of steam buses between Ponce and San Juan, it was narrowness of another sort which sought to prevent the use of the Porto Rican machines in this town. After the buses had been in operation for about a week, a petition was circulated among the citizens asking the Common Council to take steps to remove them from the streets on the ground that the machines constituted a nuisance. The Council appointed a hearing on the petition, and the meeting was attended by 150 persons. At the first hearing the petitioners offered testimony to show that the vehicles frightened horses and were likely to cause excessive damages. The livery stable proprietors were opposed to the machines, their plaint being that the buses had a tendency to make their patrons timid of hiring horses that might be frightened by the machines.

Dr. H. E. Windsor and John F. Thompson, of the Thompson Automobile Co., of Providence, promoters of the bus line, were present, with counsel at an adjourned hearing. Counsel for the petitioners called the attention of the city fathers to the following ordinance, which was passed in 1896, when there was not an automobile in Westerly:

"No person shall locate or operate a steam boiler within the compact part of the town of Westerly without the consent of the town council, and under such restrictions and regulations as it may prescribe, upon the penalty of not less than \$10 nor more than \$20 for each day said steam boiler shall be operated and used contrary to the provisions of this ordinance."

The opposition had apparently relinquished the "nuisance" plea advanced at the first hearing and centered its argument upon the legal construction of the ordinance relating to steam boilers. The question was debated at length by the attorneys and citizens, one suggestion being that the town might adopt the system in use where the steam road roller is at work; that is, place signs in the streets warning people that "steam buses run on this street." The attorney for the automobile company showed that the town was not liable for damages resultant from the use of the automobiles, for it had given no permission and granted no franchise to the operating company. Francis Graves, of New York City, was introduced as an expert, and he testified to the satisfactory conditions under which steam automobiles are run in New York and on the road from New York to Tarrytown.

The session lasted several hours, the closing argument for the bus being offered by the nestor of the local bar, who advanced the opinion that if a steam engine

was being carted through the streets and the cart was stopped to water the horses it would be "located" according to the interpretation of the ordinance offered by the attorney for the petitioners. The same rule would apply to a locomotive that stopped at the Westerly station. He considered the proposition ridiculous.

After a short executive session the town council announced that it gave the petitioners leave to withdraw. The progressive element applauded, and the buses will continue to do a passenger business in the streets of Westerly.

AWAITING FURTHER BATTERY IMPROVEMENTS IN BOSTON.

Special Correspondence.

BOSTON, Dec. 20.—Superintendent Edward A. Winchester, of the Armstrong Transfer Co., in this city, was asked this week what his company intended to do regarding the introduction of automobiles. His reply is interesting, in view of the fact that for more than a year the company has been experimenting with a re-fitted electric brougham and express van, bought after the demise of the New England Electric Vehicle Transportation Co. and fitted with the new exide batteries.

MUST RECHARGE AT NOON.

"Our company will buy no more automobiles," said Mr. Winchester, "until still further improvements have been made in the batteries. Electricity is the right kind of power for our business; it is better than gasoline or steam, I believe; but the charge we can give the batteries in the two machines which we have been using experimentally is not enough for a full day's work on an economical basis. If we run the machines through the day on the charge which they can take in over night, we find the batteries are being drained toward the end of the day. That means that they will be worn out more rapidly than if we kept them frequently recharged; so we have customarily run them up to the recharging plug in the noon lay-off. This kind of maintenance is too expensive to make the vehicles a good business proposition at present."

PLEASED WITH WORK DONE.

"There is practically no trouble about the way they do their work. One of them will do more work than the corresponding horse rig, and we prefer the electrics for long hauls of express matter where a pair of horses would be heavily taxed. The machines are faster, too, for they run at higher speed than a horse and can be started more quickly from a position of rest. One of our autos will run from the South Terminal to Boston Highlands and back in about twenty minutes, but it takes a horse that long to make the trip one way. The autos get around better in congested districts, for the reason that they take up less space than a horse-rig."

Mr. Winchester stated that his company's experience had shown that one important feature lacking in the vehicles, especially when heavily loaded, in wet or snowy weather, was a braking device that would actually control and stop their motion. It is not enough to put on the present brake, he said, for on a wet or snowy surface the machine would slide or "skid" even with its wheels blocked. What he thinks highly desirable is some gripping device for the wheels which will hold the vehicle when the revolution of the wheels is checked, yet which at the same time will not cause annoyance from jolting when the vehicle is driven over a dry surface. His men have tried placing chains around the rims of the wheels, but these have proved troublesome in many ways.

Electric Vans in the Snow.

Special Correspondence.

BOSTON, Dec. 22.—One of the interesting sights in Boston streets during the recent snowstorm was the way in which the big electric delivery vans of the Boston Auto Express Co. ploughed their way round town. Up grade or down, the snow seemed to make no difference to them, and for the most part they appeared to get around in the shopping district, where the major part of the service is given, as well as or better than horses. On the asphalt incline on Tremont Street, however, there was some trouble. Wheels shod only with the smooth solid rubber tires could not be prevented from slipping. In at least one such case the operator and his helper took off their overcoats and threw them down in the street just ahead of the wheels. The tires "caught," the van started ahead a little, and by picking the coats up from behind and repeatedly placing them in front, the rig was enabled to make its way up the slope. It was hard on the overcoats, but it was better than getting stuck with a heavy load of Christmas goods.

General Vehicle Law for Minneapolis.

Special Correspondence.

MINNEAPOLIS, Dec. 18.—A general vehicle ordinance will probably be passed this winter as a result of the recent introduction in the city council of an automobile ordinance. No final action has been taken on this measure, as Alderman Fred M. Powers, late republican candidate for mayor, gave notice of his intention to introduce an ordinance that will apply to all vehicles. There is now an ordinance regulating the speed of vehicles, which was adopted before the safety bicycle was in general use, but it applies only to horse-drawn vehicles.

The automobile pageant which will be a leading feature of the annual Tournament of Roses, to be held in Pasadena, Cal., on New Year's Day, is expected to eclipse all previous efforts. Thousands of eastern visitors attend this floral fête.

INDUSTRIAL

WASHINGTON SHOW SET FOR WEEK OF MARCH 23.

Special Correspondence.

WASHINGTON, D. C., Dec. 20.—The proposed local automobile show is an assured fact, the promoters, at a recent meeting, having decided to hold it during the week of March 23 next. It will be held in the armory of the Washington Light Infantry, on Fifteenth Street, the scene of last year's exhibition. The floor plan provides for thirty-one spaces, and of this number more than one-half have already been sold. The show will be under the auspices of the Washington Automobile Dealers' Association, composed of the principal dealers here, the only outsider in the enterprise being B. C. Washington, an experienced show promoter, who has been selected as general manager. Mr. Washington will attend the New York show in the interest of the local exhibition. He has furnished your correspondent with a list of the spaces sold, from which it appears that the following vehicles will be displayed: Elmore, Waverley, Toledo, both steam and gasoline; Spaulding, Reading, American, Meteor, Oldsmobile, Packard, Autocar, Peerless, Rambler and Locomobile. Columbia motor cycles and the Clement motor will also be exhibited, and in addition there will be Diamond, Fiske and Long Distance tires and Neverout lamps.

The year now drawing to a close has been a very successful one from the standpoint of the automobile dealers of Washington who will enter upon the new year with a feeling of contentment, as the outlook for business is exceedingly bright.

Reduced Rates to Chicago Show.

Reduced rates of one fare and one-third, on the certificate plan, have been granted by the Central Passenger Association for the good roads convention of the National Association of Automobile Manufacturers to be held at the Coliseum during the Chicago automobile show from February 14 to 21 inclusive. Application for a similar reduction has been made to the Western Passenger Association and the eastern associations. The convention is called for the purpose of approving a bill to be introduced in Congress providing for an appropriation for a national transcontinental highway.

A smoker in honor of the visiting members of the trade is to be given on the night of Thursday, February 19, by the management of the show. It is to be purely informal.

Recent additions to the list of exhibitors at the show are given as follows:

St. Louis Motor Car Co., Chicago Motor Cycle Co., Bartholomew Co., Porter

Storage Battery Co., Pope-Robinson Co., Westinghouse Electric & Mfg. Co., Fisher Automobile Co., Dow Portable Electric Co., Champion Mfg. Co., Salamandrine Boiler Co., Western Motor Co., Dayton Electrical Mfg. Co., Baldwin Chain Mfg. Co., American Roller Bearing Co., Brown-Lipe Gear Co., Midgley Mfg. Co., Cleveland-Canton Spring Co., and Otto Kongslow.

Springfield Exhibits at New York.

Special Correspondence.

SPRINGFIELD, MASS., Dec. 20.—All of the local automobile manufacturing concerns, the Knox Automobile Co., the Warwick Automobile and Cycle Co. and the Automotor Co., and the J. Stevens Arms & Tool Co., of Chicopee Falls, and the C. J. Moore Mfg. Co., of Westfield, will enter one or more vehicles of their make at the third annual automobile show in Madison Square Garden, New York. The Knox company will display four of its 1903 carriages of the type which was so successful in the New York-Boston reliability contest, its exhibit being under the personal supervision of Harry A. Knox. The Warwick company will send two and perhaps more of its new 6 horse power road wagons, and the Automotor Co. will enter one of its 16 horse power 1903 cars fitted with the King of the Belgians body. The Stevens company will show two and possibly more of the Stevens-Duryea runabouts which have been prize winners in both the New York-Boston reliability contest and the New Jersey hill-climbing contest on Thanksgiving Day. The C. J. Moore company will probably display one or more of its touring cars.

Syracuse Exhibits at the Shows.

Special Correspondence.

SYRACUSE, Dec. 20.—The H. H. Franklin Mfg. Co., the Century Motor Vehicle Co. and the Stearns Steam Carriage Co. are preparing to exhibit machines at the New York automobile show in Madison Square Garden. The Franklin company will show a car that has been run more than 10,000 miles on American roads. The Century company will have three machines there of the "Tourist" type. Two will be on exhibition and one will be used for street demonstration. The Stearns Steam Carriage Co. will show some new models of steam vehicles.

The Franklin company is also preparing an exhibit of four cars for the Chicago show. Its cars are to be sold in that city through the Ralph Temple & Austrian Co.

Henry Fournier has cabled that he will sail for New York on January 8 to attend the Madison Square Garden and Coliseum shows. He tried to secure exhibition space for the French concern in which he is interested, but none was available at the New York show.

NEW VEHICLES

Reber Touring Car.

As new to the public and the trade as the touring car shown in the accompanying illustration may be the name of its maker, the Reber Mfg. Co., of Reading, Pa. But although just making his debut in the new industry, the proprietor of the company, James C. Reber, was long identified with the bicycle business, which may almost be termed the parent of the automobile industry. He operated the plant of the Acme Mfg. Co., maker of Stormer bicycles, from the incorporation of the company, and is now occupying the old Acme company's factory, since closed by the American Bicycle Co., as a bicycle factory. Having facilities for turning out a large quantity of work in a short time, the Reber Company expects to be ready to make deliveries of these new cars by the first of the year. The new machine was designed by James G. Heaslet, formerly mechanical engineer of the Autocar Company, but now identified with the Reber Mfg. Co.

The Reber car weighs 1,650 pounds: has a wheel base of 6 feet 6 inches and gauge of 4 feet 6 inches. The tonneau is removable. It is fitted with 30-inch wood wheels, ball bearing. The frame is trussed, and the body is supported on semi-elliptic springs. The vehicle has positive wheel steering, foot brake on the differential, hand emergency brakes, double acting on each rear wheel, and the arrangement is such that application of either foot or hand brake automatically releases the engine from the running gear.

All parts are enclosed and run in oil; lubrication is positive, and all parts are accessible for inspection. Cooling water is forced through the circulatory system by centrifugal pump. Drive is by double chain. Trimmings of the car are in polished brass.

New Automotor Tonneau.

The 1903 model of the Automotor tonneau, shown in the accompanying illustration,

line tank, which is located under the front seat, holds sufficient fuel for a run of 200 miles. The brakes are double acting. The car is fitted with artillery wheels.

Until within the last six months the Automotor Company of Springfield, built only light gasoline cars, but last summer it brought out its first tonneau cars, one of the first of which was entered in the October reliability run of the Automobile Club of America, in which it demonstrated



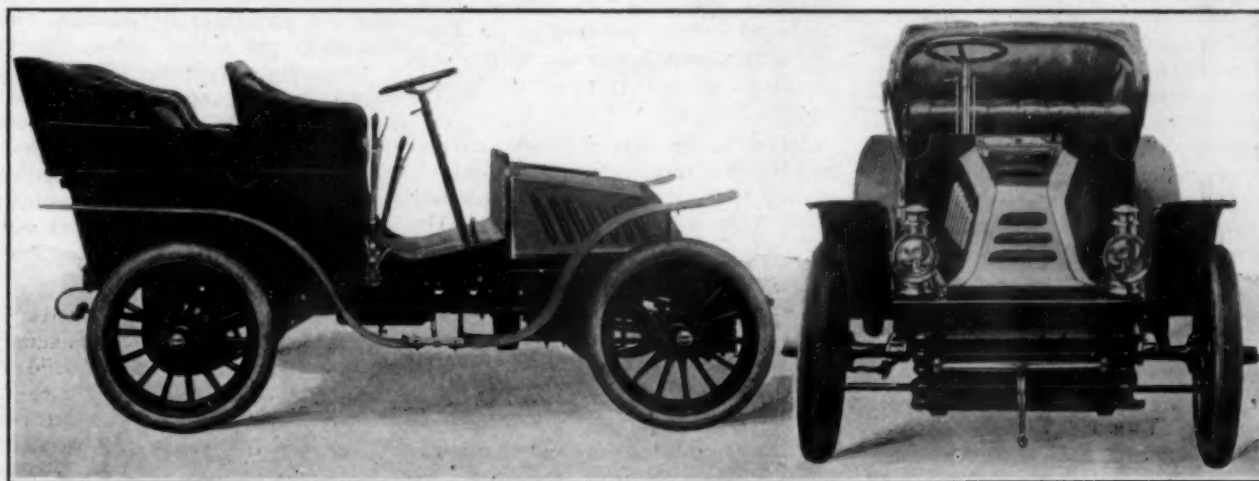
AUTOMOTOR 12-HORSEPOWER TONNEAU WITH MERCEDES PATTERN FRONT.

tion, has direct drive from the motor at the front through bevel gearing to the differential on the live axle. The motor is a two-cylinder 12 horse power engine of French design. The radiator is of the Mercedes honeycomb type through which the water is circulated by a pump chain

satisfactorily its durability. The machine here illustrated is the latest improvement on these first cars.

Taunton Automobile Co. Assigns.

The Taunton Automobile Co., whose works are located at 28 Court Street,



FIRST TOURING CAR OF REBER MFG. CO., READING - SIDE AND FRONT VIEWS

The car is driven by a double-cylinder vertical motor of 12 horse power, running at a normal speed of 1,000 revolutions. It is governed by throttle. Transmission is through slide gears giving three forward speeds and reverse, the gears being readily removable without disturbing the case

driven from the engine. The change gear is a modification of the internal gear type with two speeds forward and reverse, with direct connection on the high speed. The commutator for ignition is driven from the motor and is placed in the dash, where it is accessible for inspection. The gaso-

Taunton, Mass., made an assignment on December 12 to Daniel Brownell, of the new firm of Brownell & Burt. It is not known whether or not the business will be continued, but it is thought possible that a reorganization will be effected. When interviewed, Mr. Brownell, who is

president of the company, would make no statement, except to confirm the report of the financial embarrassment of the concern. The Taunton company was organized in 1901 and had made a number of steam vehicles.

Chance for Opening Wedge.

Special Correspondence.

WASHINGTON, D. C., Dec. 20.—According to information just received here, an international peace exhibition of South Africa will be held at Johannesburg in 1904-5. Promoters of the enterprise will shortly visit this country with a view to interesting American manufacturers. They point out that this is undoubtedly the best opportunity ever offered manufacturers for opening up trade in new and vast territories of British South Africa, where the demand for goods for many years to come will be enormous. There will be a special department for exhibits relating to transportation, and efforts will be made to secure representative exhibits of bicycles, tricycles, automobiles and motor cycles. Attention is called to the fact that there are a large number of wealthy people, well known in London society, who have their homes in Johannesburg, to which they are rapidly returning. This is a desirable class of trade to cultivate. Negotiations are in progress to secure to exhibitors important concessions in freight, duty, and other matters.

Indianapolis Storage Facilities.

Fred Spacke, a prominent and enthusiastic motorist of Indianapolis, returning home from a trip to Cleveland, asserts that the facilities of the Indiana capital for the storage and repair of motor vehicles are much superior to those of Cleveland. "While in Cleveland I was compelled to pay from \$30 to \$50 per month for the care of my machine," he said. "It had to be in by 9 o'clock. Here in Indianapolis the same service would cost me \$15 per month and I can get my machine any hour of the day or night." With the completion of the new garages to be built this winter, however, Cleveland will have facilities surpassing any town of its size in the country.

Hugh McGowan, president of the Indianapolis Street Railway Co., has purchased a beautiful machine of a local company as a Christmas present for his sister who lives in Kansas City. Mr. McGowan is also negotiating for a machine for himself. All dealers report a big increase in local interest and a bright outlook for next season.

The automobile and motor bicycle agents of San Francisco, who have made special holiday window displays, report without exception a larger Christmas trade than ever before.

New Enterprises.

The Automatic Machinery Co., of Kalamazoo, Mich., has been succeeded by the Burt Mfg. Co., 124 N. Edwards Street, manufacturers of automobiles and gasoline engines.

The Bridgeport Motor Co., of Bridgeport, Conn., has filed a certificate of incorporation, with authorized capital of \$100,000, to manufacture automobile and launch motors.

The Cadillac Automobile Co., of Illinois, has been incorporated at Springfield, Ill., with \$10,000 capital stock for the purpose of manufacturing automobiles and motors. The incorporators are Walter H. Chamberlin, George L. Williamson and H. S. Gaither.

Articles of incorporation have been filed by the Waterloo Motor Works, of Waterloo, Iowa, which has for its object the manufacture of automobiles. The capital stock is placed at \$200,000, and the officers are as follows: President, J. R. Vaughn; vice-president, O. V. Eckert; second vice-president, A. Lipton; secretary, G. B. Miller; treasurer F. B. Ballou.

Trade Brevities.

The New York agency for the Rambler runabouts has been taken by the John Wanamaker automobile department.

The headquarters for Stevens-Duryea gasoline motor vehicles in New York have been removed from 552 Fifth Avenue to 54 West Forty-third Street.

A permit has been granted to the Conrad Motor Carriage Co., of Buffalo, to erect a frame machine shop in the rear of its Niagara Street establishment.

Cook & Qwenney have opened an office in the building occupied by the Automobile Storage & Repair Co., in Washington, D. C., and will represent the Winton Motor Carriage Co.

Orders for 250 Winton touring cars of 1903 model have already been booked, according to George H. Brown, secretary of the Winton Motor Carriage Co. Deliveries are to begin in January.

T. L. Lyman, manager of the Asbestos Department of the H. W. Johns-Manville Co., New York, sailed on December 20 for Havana, Cuba, where he will remain about two weeks for the benefit of his health.

C. C. Hildebrand, formerly New York manager for the International Motor Car Co., has taken the sales managership for the Stevens-Duryea gasoline cars made by the J. Stevens Arms and Tool Co.

The Century Motor Vehicle Co., of Syracuse, has sold all of its steam surreys and will make no more. About half the output of its gasoline machines will be sold through agencies and the rest from the factory direct. The company has closed a contract with the F. O. Bailey

Carriage Co., of Portland, Me., for twenty-five of the Tourists, the first carload to be shipped April 15. It will close with New York and Philadelphia agents in a week or two.

The Warwick Automobile and Cycle Co., of Springfield, Mass., has added T. P. C. Forbes, Jr., of Flushing, L. I., to its force of salesmen. Mr. Forbes will cover New England and New Jersey.

Exports of motor vehicles and parts of same from the port of New York for the week ended December 20, are reported as follows: Amsterdam, two packages, \$508; Brazil, three packages, \$1,317; Liverpool, two packages, \$102; London, five packages, \$2,760.

The Western Automobile Co., formerly agent in San Francisco for the Olds line, which has been transferred to the Locomobile agency, has taken the agency for the St. Louis Motor Carriage Co., of whose line a carload of vehicles has just been received.

Contractors will begin the erection on January 1 of a new building for the use of the Automobile Storage Co., in Washington, D. C., whose business has outgrown the present quarters. The new building will have every modern facility and will be ready for occupancy early in the spring.

Chas. E. Miller & Bro., of Washington, D. C., have added the American Electric Vehicle Co.'s line. They are looking for new quarters, their present accommodations being inadequate to the proper handling of their business.

The W. C. Jaynes Automobile Co., of Buffalo, recently received from Durban, South Africa, a query as to what it could deliver an Oldsmobile for in Port Natal, C.O.D. The query came from J. Price, of Price Brothers & Overholt, American dentists.

Frye Brothers, George and J. W., heretofore in the trade at Charlton, Iowa, arrived in San Francisco last week and purchased the John Curtis Auto and Cycle Agency. Owing to ill health of his wife Mr. Curtis disposed of his business and will locate in Arizona, where he will soon be re-established in the trade.

The Buffalo Gasoline Motor Co. has bought a piece of land on Niagara Street, Buffalo, for the purpose of building thereon a two-story fireproof factory. The company expects to occupy its new building by the 1st of March, next year. It has outgrown its present establishment on Bradley Street and its business is increasing steadily.

The Fisk Rubber Company, of Chicopee Falls, Mass., desires to correct an impression which it learns has gained currency, to the effect that double tube Fisk detachable tires are made under G & J patents. The company states that it owns and controls the patent covering this tire, for which eight claims have been allowed.

Grout Bros. will exhibit a new steam touring car at the Madison Square Garden show next month. It is of the tonneau type, driven by a 12 horse power engine and weighs 2,500 pounds. The boiler has great steaming capacity, and the car is fitted with one of the Grout condensers, which will enable it to make 100-mile non-stop runs.

Additional factory space has been leased by the Knox Automobile Co., in the Potter Building, Springfield, Mass., and new machinery will be installed at once in order to increase the output of Knox-motors to eighteen per week. Ten vehicles per week are being made at present. The company is reported to have orders ahead for all the vehicles it can make in its plant during the next three months.

W. Leon C. Kenan, Swiss draftsman for the Continental Automobile Co., 150 Nassau Street, New York, is now in attendance at the French show representing the interests of the company. Later he will visit the leading French manufactories to note any modifications of value in the new cars and to arrange preliminaries of contracts the company is making for the importation of foreign machines during the coming year.

Announcement is made that the Automobile Co., of Washington, D. C., has succeeded to the business of the W. C. Koller Carriage Co., on Connecticut Avenue. The officers of the new company are as follows: W. C. Koller, president; R. H. Shindel, treasurer; A. L. Cline, secretary and general manager. There will be no change in the vehicles handled, which include the Rambler, National and Locomobile.

George Odenbrett, of the Bates-Odenbrett Co., of Milwaukee, said last week that he expected the delivery of the new Winton model within the next week or ten days. The company is agent for the Winton and Locomobile. In addition, it has storage and repair departments. Mr. Odenbrett said that his "boarding stable" has proved a good venture. Many machines are stored for persons who have offices downtown, and who call for their vehicles any time they desire them during the day.

The Mobile Company of America has leased the entire building at the corner of Fifty-fourth Street and Broadway, New York, which has been used as a carriage factory and sales rooms for several years. The entire executive offices of the company have been moved from Tarrytown to the new location, where all correspondence for the company should be addressed. The Mobile Rapid Transit Co. will also make its headquarters in the same building. It is the intention of the Mobile Company to do a large storage and repair business, for which the building leased is excellently adapted, being spacious, well lighted and conveniently located.

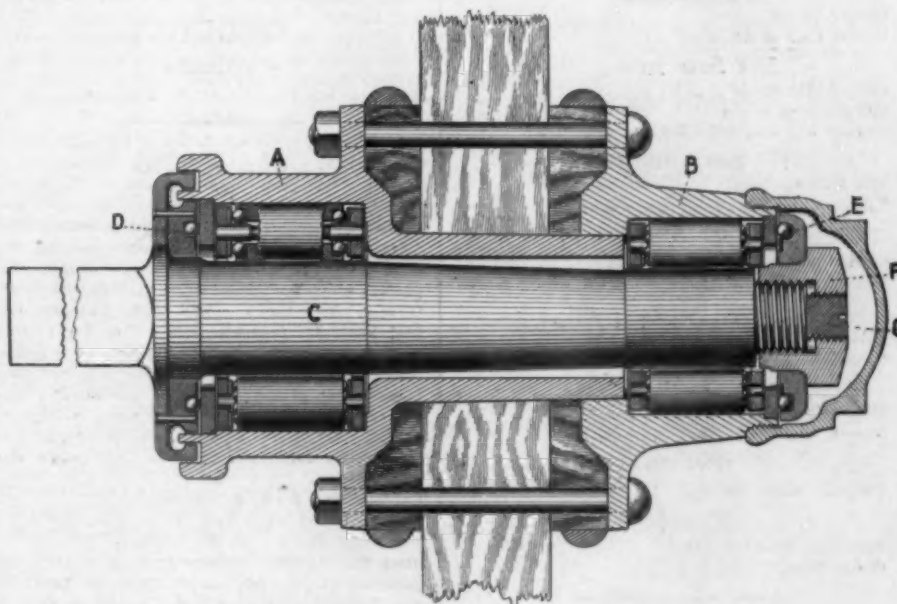
INFORMATION FOR BUYERS.

COVERT MOTORETTE AGENCY.—A completely equipped sales, storage and repair station has been opened recently at 248 West Fifty-fourth Street, New York, by Fickling & Fulton, automobile brokers, who have secured the New York agency for the Covert motorettes and touring cars. They have also organized a branch of their business to fill orders for automobiles of all makes and patterns, and have facilities for building machines to order. Fickling & Fulton have taken space No. 100 at the New York automobile show.

ROLLER BEARING WHEEL HUB.—The illustration herewith shows in sectional view the application of Moffett roller bearings to vehicle hubs of the Concord style. The essential features of the Moffett roller bearing are: The use of very large rollers, one-half the size of the spindles or shafts on which they run; the use of very substantial cages, built up of end rings spaced by pieces of triangular section between the rollers, the end rings being riveted to the spacing pieces before being drilled for the spindles guiding the rollers; the use of ball bearings at each end of each roller, the rollers being recessed for this purpose and the balls bearing against the fixed pins passing through

by a charge exploding in the center space of the cylinder, and by this means, it is contended by the manufacturer, there is realized the highest degree of energy that may be secured from a gasoline engine. In other points, the motor does not differ greatly from that of conventional design. The maker declares in his prospectus that he has striven for simplicity as well as strength in constructing his engine. The motor may be controlled either by varying the compression or by the lead of the spark. It is sold with induction coil, spark plug, mufflers and batteries ready to connect, and is made in 8, 12 and 16-horse power. Charles E. Miller, the New York agent, is equipping a tonneau of 2,600 pounds with the engine, which is called the Binate, to demonstrate its capabilities.

TONNEAU BODIES.—The Frantz Body Mfg. Co., of Akron, Ohio, is making two new styles of detachable tonneau bodies. The one to which the company has given the number 200 is 8 feet 9 inches in length, 34 inches in width and the height (inside) is 18 inches. Both front and rear seats are fitted with bent backs. By removing the tonneau, the two-passenger vehicle is left with a good-sized luggage platform. The open-



•MOFFETT ROLLER BEARING HUB.

the rollers and also against the rollers themselves, so that the weight of the cage is wholly supported from the rollers by means of the balls, eliminating sliding friction due to the weight of the cage. The parts A B of the hub are of cast steel accurately finished inside, and the spindle C is case hardened and ground, it being considered unnecessary to provide hardened sleeves for the rollers under such conditions. The end thrust is taken by the ball thrust rings D E, the whole anti-friction equipment being carefully protected from dust. To adjust the thrust rings, the double nut F is provided, having the adjusting screw G. When this screw is properly adjusted, the nut F is screwed up till G abuts against the end of the spindle. The latter and the screw G are threaded in opposite directions to minimize the liability of F working loose.

DOUBLE-PISTON MOTOR.—A design well-known in France, but not here, has been placed on the market by R. W. Coffee & Sons, of Richmond, Va. The engine has for its principal feature an arrangement of two pistons working in a single cylinder. These pistons are driven

ing left by removing the tonneau is covered with a deckboard. No. 300 has a length of 74 inches, width 34 inches and inside height 18 inches. This body is designed for vehicles in which the motor is under the front seat. An extra seat may be provided with the rear tonneau door as back, if ordered.

HORNS OF NEW TONE.—Charles E. Miller, of New York, has imported a lot of large horns for use with touring cars. They have been made to order and are fitted with flexible metallic tubing and screen over the mouth. The diameter of the bell measures 8 inches. The new feature in them which is of greatest interest is the new tone which, it is stated, is one that has never been heard before.

FIRESTONE TIRES.—The Fisk Rubber Co. has arranged to represent, exclusively, the Firestone Tire & Rubber Company in the cities of Springfield, Syracuse, Buffalo and Detroit, where they have branches for the sale of the Fisk bicycle and automobile tires, of their own manufacture, and are prepared to quote prices, deliver and attach the Firestone Side-Wire solid tires.

STORAGE, REPAIR AND SUPPLY STATIONS SPEED LAWS AND OTHER REGULATIONS

ARIZONA

Prescott

Brown Bros.

Tucson

Jas. B. Saeger.

CALIFORNIA

SPEED—By local ordinances limited 4 m. to 12 m. Penalties, not exceeding \$500, or imprisonment not exceeding 6 mos. Lamps and Bells—Required by most ordinances. License—In Napa, \$10 a year. San Francisco forbids storage of more than 5 gallons of gasoline within buildings.

San Francisco

Lakin St., 909. Leavitt & Bill.
Tremont St., 97. Manufacturers Co.
White Sewing Mach. Co.

Oakland

Leavitt & Bill.
Mobile Co., of America.

San Jose

Osen & Hunt.
Millard Bros.
Market St., So., 136. Letcher Mfg. Co.

Sacramento

Jim Banta.
Viking Cycle Co.

Los Angeles

Broadway, So., 108. Locomobile Co., of America.
Main St., 439. Crippen & Church.

San Bernardino

Parker Iron Works.
Williams Cyclery.

Riverside

Magnolia Auto. Co.
Stoner Machine Shop.

Redlands

Redlands Iron Works.

Pasadena

Pasadena Machine Shop.
Hodge Bros.

COLORADO

Denver

California St., 1455. Geo. E. Hannan.
Felker Automobile Co.

Colorado Springs

W. O. Anthony.
F. F. Burnstead.

Pueblo

C. W. Fowler.
Pueblo Novelty Works.

CONNECTICUT

SPEED—Outside city limits, 15 m.; inside, 12 m.; reduced at crossings; penalty for violation, not more than \$200. Horns or Gongs—Not required by letter of law. Lamps—Required on all rubber-tired vehicles; must be lighted from 1 hour after sunset to 1 hour before sunrise; penalty, \$5. If lights go out, operator "may proceed at 6 m. and give audible signal as often as 500 ft. are passed over."

Hartford

Aliyn St., 304. S. A. Miner.
Wells St., 43. Hartford Automobile Station.

New Haven

Goffe St., 105. H. C. Holcomb.
State St., 532. Reichert's Auto. Station.

DIST. OF COLUMBIA

Washington

SPEED—Outside city limits, 15 m.; off car-line streets, 12 m.; on intersecting car-line streets, 6 m. License—Required; fee, \$3; penalty, for operating steam vehicles without permit, \$1 to \$40.

Conn. Ave., N. W., 1124. National Capital Auto. Co.

FLORIDA

Jacksonville

F. E. Gilbert.

GEORGIA

Atlanta

Forsythe St., So., 55. C. H. Johnson.

ILLINOIS

Chicago

SPEED—Everywhere in town, 8 m. Bells—Required, to be sounded at street crossings, etc. Whistles and Horns—Prohibited. Lamps—Required; must be lighted between dusk and dawn. License—Operators required to have license; fee, first year, \$3; thereafter, \$1. Fine for driving without license, \$5 to \$25. Numbers or Initials—Not required. Brakes—Two sets required, one independent of driving gear. Special—No machinery may be left running when vehicle is standing in street with no one in charge. In other cities and towns, various local regulations apply.

Calhoun Pl., 4. A. J. Millman.
Cottage Grove Ave., 5311. C. A. Coey & Co.
Plymouth Pl., 12. S. S. Williams.
State St., N., 285. Chicago Auto. Repository Co.
Superior St., E., 385. North Division Auto. Co.
Van Buren and Oakley Blvd. Hagmann & Hammerly.

INDIANA

SPEED—No state law. Various local regulations 8 to 10 m. in city limits. Fine for violation, \$1 to \$50.

Terre Haute

S. Seventh St., 25. A. Chaney & Bro.

IOWA

SPEED—No state law. Davenport City Ordinance limits speed to 8 m. Bell and Lamp—Required.

Cedar Rapids

Cedar Rapids Supply Co. J. C. Pickering.

Des Moines

Eighth and Locust Sts. W. J. Riddell.

LOUISIANA

New Orleans

Baronne St., 400. Automobile Co., Ltd.
Baronne St., 408. Abbott Automobile Co.

MASSACHUSETTS

SPEED—State law provides outside city limits, fire district or thickly settled part of town, 15 m.; inside such limits, 10 m.; approaching horses, reduce speed if animal shows fright and stop on signal of driver; reduce at crossings. Penalty—Fine not exceeding \$200, or imprisonment not exceeding 10 days, or both. Ordinances—Various local regulations in cities and towns.

Boston

SPEED—In city streets, 10 m.; in parks, 8 m.; outside city, 15 m. Lamps—Three required. Parks—Permit required from Park Department. Columbus Ave., 43 and 45. G. T. Gould.
Columbus Ave., 147-153. A. J. Coburn & Co.
Clarendon and Stanhope Sts. Back Bay Hydro-Carbon Repair Co.

Stanhope St., 66-68. Tremont Auto. Headqts.
Tremont and Berkley Sts. Boston Salesrooms.

Cambridge

Mass Ave., 424. Crest Mfg. Co.
Palmer St., 8-10. Harvard Auto. Co.

Salem

Dodge & Lafayette Sts. Zina Goodell Mfg.

Springfield

SPEED—State law applies. Reduce at street intersections. Lamps—Required 1 hour after sunset; not enforced. Alarm—Required to be sounded as necessary. Parks—Permit required for Forest Park; furnished free; rules accompany permit. No registration.

Taunton

Post Office Sq., 4-5. Robertson Auto. Station.

Waltham

Newton St., 136. Waltham Auto. Co.

Worcester

SPEED—10 m. Gong or Horn—Required. State law applies.
Foster St., 43. Worcester Auto. Station, No. 1.
Main St., 671-673. Robinson Auto. Station.

MISSOURI

Kansas City

11th St., E., 320. Day Automobile Co.
Main St., 708. Wittman Co.

St. Louis

Olive St., 3935. Miss. Valley Transportation Co.
Olive St., 4250. Missouri Auto. Co.

NEBRASKA

Omaha

Olds Gas Engine Works.

NEW JERSEY

SPEED—Various city, town and county ordinances, limiting to 6 to 12 m.; penalty, \$5 to \$200. Lamps—Required in some towns, together with alarm signals. Initials—Required by most of the ordinances.

Atlantic City

Atlantic Ave., 1003. J. C. W. Parsons.
Maryland Ave., S., 12. H. W. Cokran.

Newark

Mechanic St., 27. W. B. Dodge.

Paterson

Broadway, 405. F. W. Stockbridge.

NEW YORK

COCKS LAW—Speed—Outside corporate limits, 20 m.; on bridges, 4 m.; inside corporate limits, 8 m., except where higher speed is permitted by local ordinances; penalty, \$50 or imprisonment not exceeding 6 mos., or both. Highway Law (Doughty)—Speed—Outside built-

up parts of towns and villages, 15 m.; in built-up parts, 8 m. Registration—Owner must secure certificate within ten days after getting machine; fee, \$1. Initials—3 in. high, 1/2 in. wide on back of each vehicle. Lamps—2 required, white in front, red in rear; must be lighted 1 hour after sunset, 1 hour before sunrise. Horn or bell required. Brakes—Good and efficient; penalty not exceeding \$25. Local Ordinances—The state law prohibits local town and park boards from excluding automobiles from open highways; from placing lower speed limits than 8 m., and from requiring license or permit except from owners of public vehicles.

New York City

7th Ave., 515. Smith & Mabley.
38th St., 136. Standard Auto. Co.
38th St., W., 138. Oldsmobile Co.
38th St., W., 141. Banker Bros. Co.
43d St., W., 38. A. G. Spalding & Bros.
43d St., W., 50. Banker Bros. Co.
44th St., W., 307. Long Acre Auto. Depot.
44th St. and 5th Ave. Westchester Auto. Co.
50th St., W., 239. Alexander Fisher.
51st St., W., 143. Knickerbocker Auto. Station.
57th St., E., 140. John Wanamaker.
57th St., E., 154. Metropolitan Motor Car Co.
58th St., E., 33-39. Barry & Hayes.
58th St., E., 150-152. Winton Motor Carriage Co.
59th St., W., 306. A. Elliott Ranney.
60th St., W., 10. Webster Auto. Co.
60th St., W., 38. American Storage Co.
66th St., W., 57. St. Nicholas Auto. Depot.
80th St., W., 260. Pa-delford & Bell.
86th St., E., 205. Yorkville Auto. Station.
89th St., W., 202. West End Storage Co.
98th St. and 5th Ave. E. R. Fisher.
100th St., cor. Broadway. Homan & Schulz.
120th St., E., 175. Chas. Strathman.
127th St., W., 152. West End Auto. Exchange.
127th St., W., 153. Harlem Auto. Co.
Broadway, 1684. Central Auto Co.
Jerome Ave., 1918. Hoffman & Setzer.

Brooklyn

Bedford Ave., 712. Lincoln C. Cocheu.
Bedford Ave., 752. J. W. Mears.
Bedford Ave., 1148. Arthur R. Townsend.
Clinton St., 10. Maltby Mfg. Co.
Flatbush Ave., 342-44, near Eighth. A. G. Southworth.
Flatbush Ave., 473. Alex. Schwalbach.
Fulton St., 1239. Brooklyn Auto. Co.
Fulton St., 1241. Chas. W. Spurr, Jr.
Schermerhorn St., 58. Patterson & Shaw.

Albany

Central Ave., 97. Auto. Storage & Trading Co.
Pearl St., N., 167. Albany Auto. Works.
Sherman St., 255. C. F. Weeber Mfg. Wks.

Amsterdam

Division St., 8. Gode & Brown.

Buffalo

SPEED—8 m. on built-up streets, 15 m. outside; rounding corners, 5 m. Lamps—All hours after sunset. State law applies in other regulations.
Broadway, 58-60. D. C. McCann.
Main St., 873-875. W. C. Jaynes Auto. Co.

DRAFTING TOOL—The Universal Drafting Machine Company, of Cleveland, Ohio, markets a smaller edition of the Universal Drafting Machine, which it calls the "Rapid Sketching Device." The former machine is probably familiar by this time to most superintendents and chief draftsmen. It consists of a light but stiff parallel motion, attached to the upper left-hand corner of the drawing board, and carrying at its free end two removable scales at right angles to each other. By means of a protractor suitably arranged in the head to which the scales are attached, the latter may be set at once to any desired angle. This device takes the place

Rochester
Exchange St., 74. C. J. Connolly.
South Ave., 150. Rochester Auto. Co.

Syracuse

SPEED, ETC.—See state law. No local legislation.
Onondaga St., W., 110. Hoffman & Weaver.
Warren St., So., 346. Syracuse Auto. Co.

Troy

Fulton St., 359. James Lucey.

Utica

Oneida Square. Miller-Mundy Motor Carriage Co.

OHIO

SPEED—Various ordinances in cities, towns and villages, 5 m. to 15 m.; penalty, \$1 to \$100. Lamps and Bells—Required by most ordinances. Registration—No state law.

Cleveland

SPEED—Within 1/4-mile from east and west ends of Superior Street viaduct, 7 m.; outside such radius, 15 m. Must stop upon signal from horse driver. License—Required; fee, \$1. Numbers—Registered numbers must be attached at rear and kept clean. Lamps—One on each side must be kept lighted during darkness. Bell or Horn—Required, and must be sounded when there is danger of accident. Penalty—For violation of any section, fine not exceeding \$50.
Prospect St., 146. The Cleveland Automobile & Supply Co.

Columbus

SPEED—Off of business streets, 14 m.; on business streets, 8 m. Penalty—Fine from \$5 to \$50 or 30 days' imprisonment. Bells or Horns—One or other required to be sounded when necessary. Lamps—Required after dark. Penalty—Fine not exceeding \$50.

Toledo

SPEED—Inside city limits, 10 m.
Jefferson St., 903. Lichtie Automobile Co.

Cincinnati

SPEED—In streets and parks, 8 m. Horns or Gongs—Must be sounded 100 ft. before street crossings. Lamps—Must be lighted between sunset and sunrise. Brakes—Efficient brakes required. License—None required. Initials—None required. Tolls—Bridge toll, 10 cents. Special—Two vehicles must not travel abreast.
Main St., 640. Special Motor Vehicle Co.
Race St., 807-809. Cincinnati Auto. Co.

PENNSYLVANIA

SPEED—Various ordinances limit it 6 m. to 10 m. Penalty—\$10 to \$100. Lamps and Bells—Required by a few ordinances.

Philadelphia

Broad St., N., 138. Quaker City Auto. Co.
Broad St., N., 246. Winton Motor Carriage Co.
Broad St., N., 250. Pennsylvania Elec. Vehicle Co.
Broad St., N., 304. Broad St. Auto. Station.
23d and Walnut Sts. John Wanamaker.

of T squares, triangles and scales, resulting in a great saving of time in detail work. The Rapid Sketching Device is similar to the larger machine, but has only one scale instead of two, and is adapted for use on a 19-inch by 23-inch board for sketches 18 x 20 inches. The single scale has a free motion of 90 degrees between two stops, so that no appreciable time is lost laying out vertical lines. In addition, the protractor is provided as in the larger instrument.

MOTOR CYCLES, MOTORS AND PARTS.—The Bradley Motor Co., 268 Diamond St., Philadelphia, Pa., having increased its facilities, is now in position to give prompt attention to or-

Lancaster

Queen St., N. 219. S. G. Roth.

Pittsburg

SPEED—6 m. to 10 m. Penalty—\$25 to \$100. Tax—Single-seated vehicle, \$6; others, \$10.
Center Ave., 5909. Pittsburg Automobile Co.

York

SPEED—In city limits, 8 m. Lamps—Must display one or more lights.
George St., N., 14. J. P. Oden.
Market and Beaver Sts. J. H. Snyder.

RHODE ISLAND

SPEED—Law provides that any person driving faster than a common traveling pace in any of the streets of Newport or Providence, or in the compact part of any town or village, or in any road leading from Pawtucket to compact part of Providence be fined from \$5 to \$20, or imprisoned for 10 days. For racing on roads, or streets, \$10 or imprisonment for 10 days. Bells and Horns—One or other required, but must not be used excessively. Muffler—Required at all times on public highways. Initials—In black letters 2 in. high.

Providence

Opposite Union Station. H. G. Martin & Co.

TEXAS

Houston

Main St., 1015. Houston Automobile Co.
Texas Ave., 903. The Hawkins Auto & Gas Engine Co.

El Paso

P. L. Abel Cycle Co.
El Paso Cycle Co.

Dallas

D. W. McElroy.
Texas I. & M. Co.

Galveston

Market St., 2130. E. H. Labadie.
Tremont St., 712. J. Christensen & Co.

San Antonio

Commerce St., W., 218. Roach & Barnes Co.
Navarro St., 809. Chas. J. Chabot.

UTAH

Salt Lake City

Main St., So., 33. O. R. Meridith.
2d So. St., W., 62. Wilkes Cycle Co.

WISCONSIN

SPEED—Limited by various ordinances 4 m. to 10 m.; penalties, \$1 to \$50.

Milwaukee

Broadway, 501. Bates-Odenbrett Auto. Co.

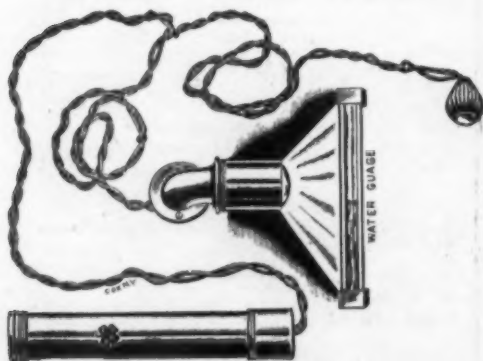
ders for complete motor cycles, finished motors and castings, carbureters, mufflers, spark plugs, belt pulleys and other accessories for motor cycles. The company makes motors and furnishes castings for motors of 11-4, 13-4, 21-2 and 3 h.p., and makes larger motors upon demand. The company is issuing a new catalogue.

MOTOR BOAT STORAGE.—Essex Foundry, of Salem, Mass., have built a 175-foot, one-story addition to their plant. This addition is intended to shelter motor boats during the winter and now has thirty for storage. Essex Foundry have built several launches during the past season.

INFORMATION FOR BUYERS.

WOOD MUD GUARDS.—While metal or metal and leather is the material most commonly employed for the mud fenders of automobiles there are about a dozen manufacturers in this country who prefer wooden guards in point of appearance and durability, entirely apart from their lower price, and these are now made in all styles, sizes and shapes, including the "plow share twist" variety generally used for the steering wheels. The American Veneer Company, 449 Pacific Avenue, Jersey City, N. J., has turned its attention to this article and has developed a laminated guard which does not split, warp, shrink or crack. It is formed of three layers of whitewood, each 1-8 inch thick, glued together, and the grain of the middle layer running crosswise and at right angles with the grain of the outside layers.

GAUGE GLASS LAMP.—Constant watchfulness of the water gauge glass becomes almost second nature to the operator of a steam vehicle and is observed almost unconsciously during daylight driving. But when it comes to driving after nightfall, especially on very dark nights, this important duty grows irksome and difficult without some good means for brilliantly illuminating the water glass. It is to provide such an illuminator that the Evening Star gauge glass lamp is offered by the Electric Contract



EVENING STAR WATER GLASS LAMP.

Co., 53 Maiden Lane, New York. As shown in the accompanying cut, this consists of a curved metal bracket or elbow designed to be screwed to the side of the body in such position that the incandescent light bulb carried at its end will throw its rays directly upon the water glass. Connected with this bulb by means of insulated flexible wires is a dry battery cell and a push button switch. Pressure upon this button illuminates the glass whenever desired. If the driver wishes to examine other parts of the vehicle or machinery he can quickly remove the bulb from its bracket and attach it to the battery cylinder, making a convenient portable electric torch.

CALENDARS FOR ENGINEERS.—The Ashton Valve Co., 271 Franklin Street, Boston, is mailing 1903 calendars to its friends in the trade and to the engineering fraternity whose names are on its books, and will be pleased to send copies to any engineer upon request if he will state the particular plant of which he has charge. To others who are not so closely identified with the company's particular line a charge of 10 cents will be made to cover cost of mailing.

LANE AUTOS.—The Lane Motor Vehicle Co., Poughkeepsie, N. Y., has been singularly fortunate in the contests where its machines were entered. These automobiles received the highest honors in the New York-Rochester contest, September, 1901; the Long Island contest, April, 1902, and that of the Automobile Club of America held in May, 1902. In the more recent reliability run between New York and Boston, a Lane steamer of nine horse power, weighing 1,790

pounds, qualified for the President's cup. Another Lane steamer of nine horse power, 100 pounds lighter, received a first-class certificate.

SELF-CLOSING COVER.—The Winkley Oiler Co., Hartford, Conn., is making an oil cup with a self-closing cover. The neck of the cup is made so as to admit a coiled spring made of



WINKLEY OILER.

piano wire. The operator opens it by a slight turn to the right. It closes of itself when released. The cover projects sufficiently so that the operator will not grasp a stationary part of the cup.

SELF-LUBRICATING JOURNAL.—The American Yacht & Motor Co., of St. Louis, Mo., has made arrangements to manufacture and market a new self-oiling hub and bearing for the wheels of automobiles and other vehicles and for machinery pulleys. The company is sole owner of the patent on this device, which is simple in construction and which, when filled with lubricating oil, will not require further attention for from two to six months. The journal in which fits the spindle of the axle or the shaft of the pulley is made with an annular channel for the reception of the oil, which is introduced through a capped tube that penetrates the hub in the plane, but inside of the spoke line. One or more orifices inside of the journal permit the oil to find its way from the chamber in the journal to the spindle. The oil chamber is air-tight to the outside so that no dirt or dust can enter.

MINNESOTA REPAIR STATION.—The Enterprise Machine Works, of Spring Valley, Minn., is especially fitted up for the lighter class of machine work, and the proprietor, Edwin Kilburn, has had three years' experience in repairing both steam and gasoline automobiles. Spring Valley is in the extreme southeastern corner of the state, and motorists passing through will find Mr. Kilburn ready and pleased to render any assistance needed.

TOURIST CATALOGUES.—The new catalogue of the Century Motor Vehicle Co., of Syracuse, N. Y., devoted entirely to the new Tourist gasoline car, will be out in a few days and will be mailed to a large list of inquiries at once. The company has had inquiries for agencies from all of the leading cities of the United States.

OIL HOLE COVERS.—The Bay State Stamping Co., of Worcester, Mass., has begun the manufacture of a new cover for automobile oil holes. It is made with screw-threaded top with packing for an oil-tight cover and without thread for common bearings. It is made from



BAY STATE OILER.

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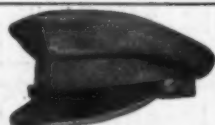
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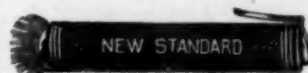
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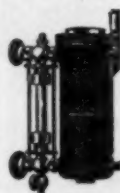
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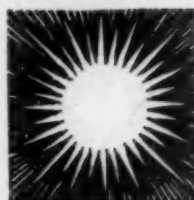
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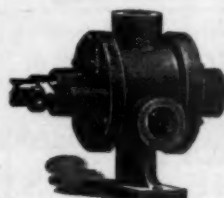
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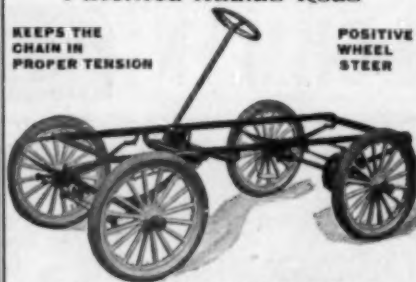
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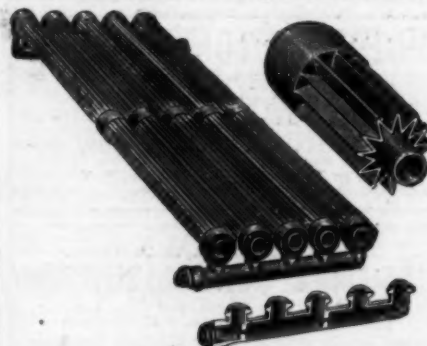
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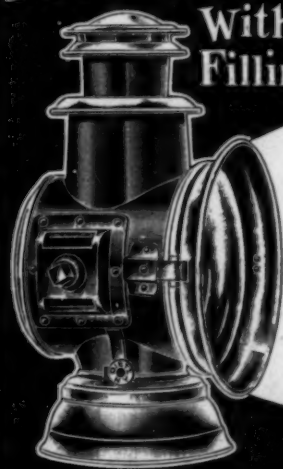
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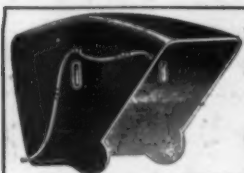
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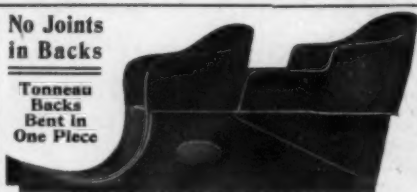
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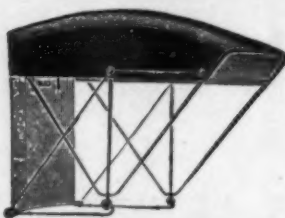
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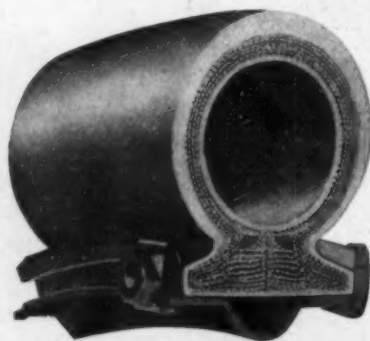
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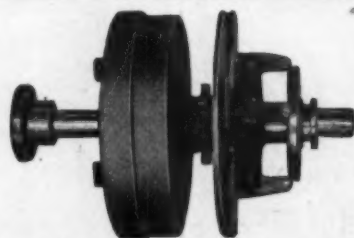
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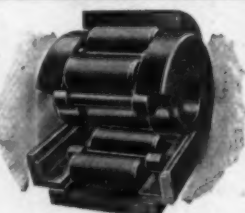
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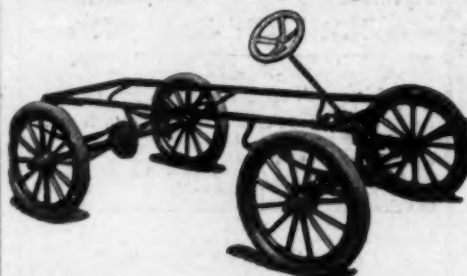
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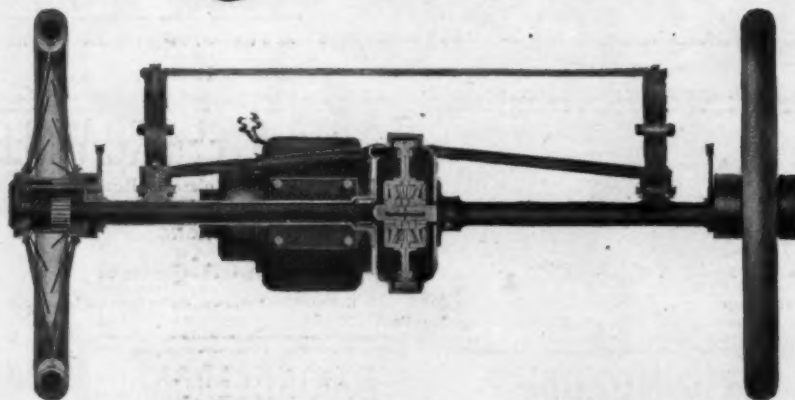
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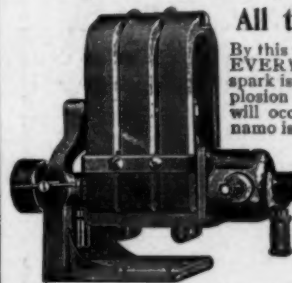
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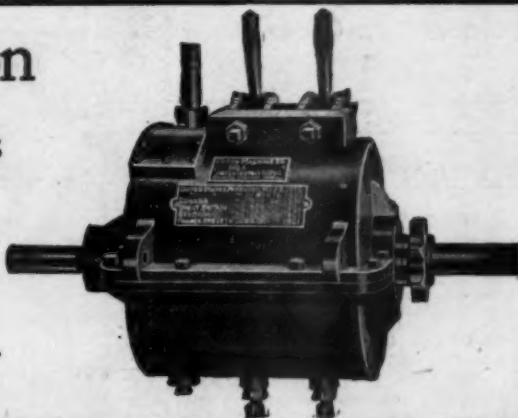
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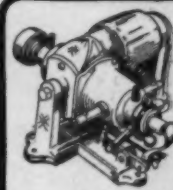


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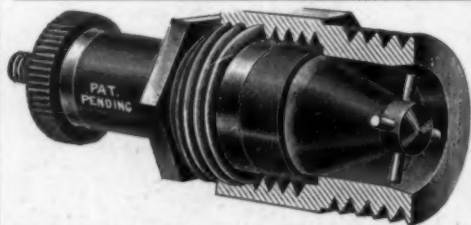
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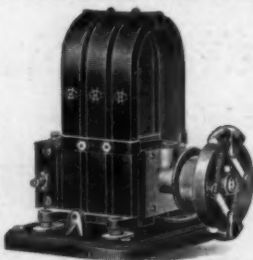
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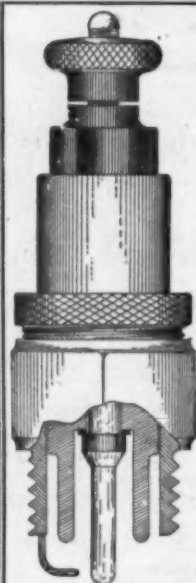
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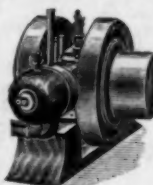
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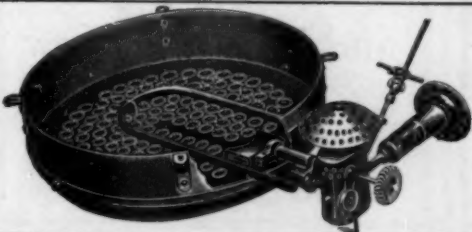
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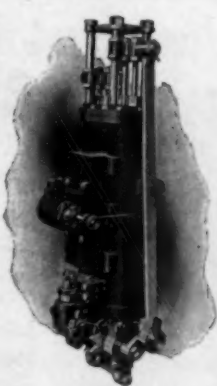
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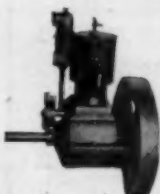
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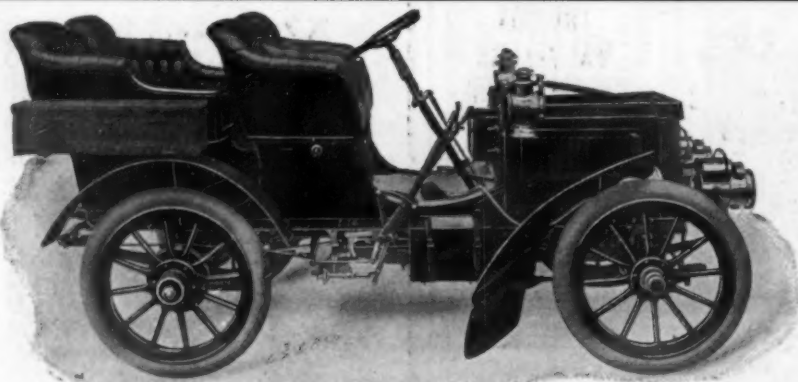
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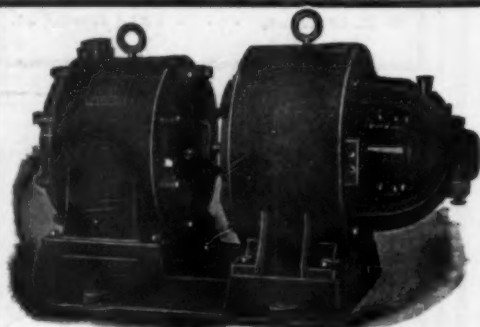
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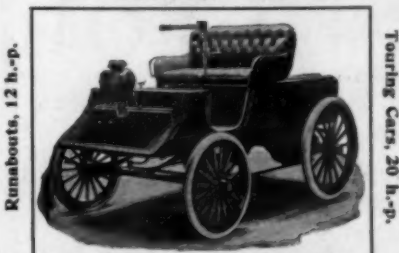
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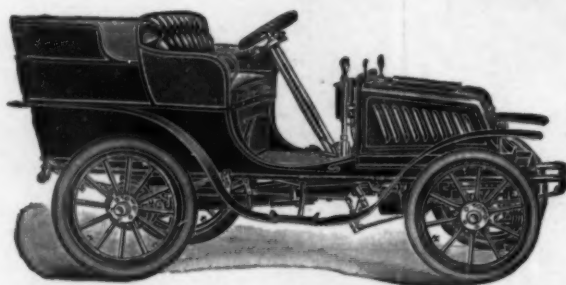
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